THE IRON AGE

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New Alloy Steels, Machines and Methods to Be Seen at Metal Show

IT has come to be recognized that the annual show held by the American Society for Steel Treating records the achievements of the metal-making and metal-working industries generally. A visitor to the National Metal Exposition, to be held at Commercial Museum, Philadelphia, the week of Oct. 8, will be shown the latest developments in steels, alloys, testing and control equipment, heat-treating appliances, and metal-working tools. In order to help such an onlooker appraise the progress which has been made in recent months, many of the exhibitors have forwarded special information to THE IRON AGE.

This is an era when we move rapidly and are building boldly. Speed and bulk are commonplace matters. But Lindbergh could not have flown to Paris, nor could the Hudson River be spanned until an enormous amount of work had been done by metal and machine makers to produce an even flow of fine metal of utter dependability.

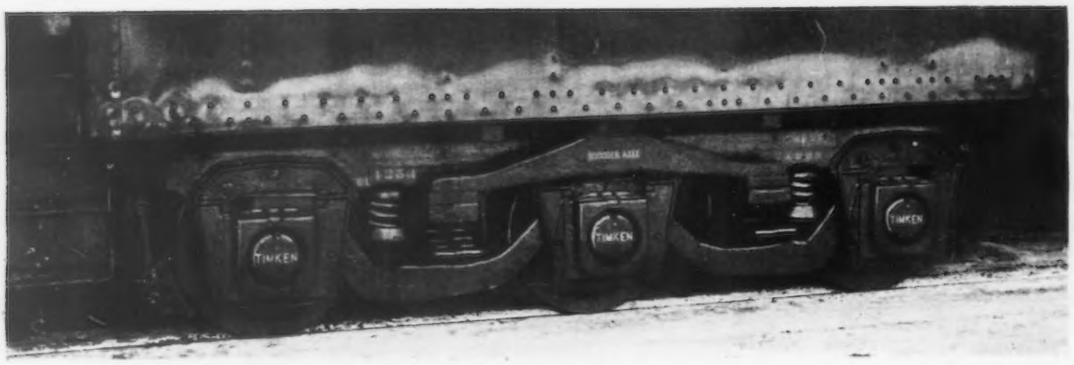
The demands of today, and those of only a few decades ago, are vividly contrasted in the sketch showing the relative sizes of the Brooklyn Bridge (in its day one of the wonders of the world) and the new Hudson River bridge now under construction. One firm, John A. Roebling's Sons Co., Trenton, N. J., is responsible for the cables on both these bridges. Compare the Norway iron bridge wire used 80 years ago, having an ultimate strength of 90,000 lb. per sq. in. with the high carbon acid open-hearth steel wire being made for the new mammoth structure, having an average strength of 231,000 lb. per sq. in.! This is a good measure of the improvement made in all fine steels.

Growing Demand for Special Steels

Many manufacturers of special steels report a gratifying increase in business. For instance, the Timken Roller Bearing Co., Canton, Ohio, has noticed so decided an increase in the demand for high-grade alloy steels from manufacturers of all sorts of equipment as to warrant tripling the capacity of the Timken steel plant, installing a group of electric furnaces for scientific annealing of the product, and organizing a subsidiary company—Timken Steel & Tube Co.—to handle the business. The Donner Steel Co., Inc., Buffalo, is also producing an increasing proportion of alloy steel bars. To meet the demand for more specialized qualities and finishes cold drawn bars and "die-rolled" products have been made since the first of the year, and the first electric furnace steel was produced on June 15. Similar movements have been reflected in operations at the works of the Universal Steel Co., Bridgeville, Pa. During the past year additions and improvements have been made in its electric



IMPROVEMENT in Quality of Steels in Recent Years Is Gaged by Comparing the Size of Hudson River Bridge, Now Building, With Brooklyn Bridge, for Decades the Largest of Its Kind



Railroads Economize on Power and Maintenance by Using Alloy Steel Bearings

melting, rolling mill and annealing departments, and two new departments for cold drawing and cold rolling were placed in full production.

Much of this expanding tonnage of high-grade steels is absorbed by the automobile industry. Some firms have secured desirable business from the manufacturers of aircraft and aircraft engines. Particularly, the Carpenter Steel Co., Reading, Pa., reports its most notable advances as being in the production of special chrome-nickel, chrome-vanadium and other steels for highly stressed airplane engine parts. This company has also produced a free cutting stainless iron by the addition of a small quantity of zirconium sulphide. The Climax Molybdenum Co., New York, is successfully promoting the use of chrome-molybdenum steel tubing for the construction of fuselage skeletons. Americans now prefer all-welded metal aircraft structures to the older wood and steel composite types, on account of added safety. Chrome-molybdenum steel is said to lend itself best to welded construction, because the heated joint air-hardens on cooling and thus regains nearly all the original strength.

Alloy Steel for Hardware Products

Important though the automotive industry undoubtedly is, as a purchaser of fine steel, a reviewer of trends in the industry must not overlook important other outlets which are only now appearing. Hardware is one of these branches which has great possibilities. Recently J. H. Williams & Co., Buffalo, have been making drop-forged and heat-treated wrenches of chrome-molybdenum steel; the product is held as setting a new standard in uniformity and reliability; and such wrenches have given a kind of service as to warrant a guarantee by the makers against breakage from any cause.

Railroads, even better customers of the steel industry than automobile plants, are also giving increasing attention to alloy steels, according to the International Nickel Co., New York. Nickel steels are now being made into main frames for locomotives, driving rods, axles, boiler and firebox plate, seamless tubes and staybolts. Nickel-molybdenum steel has also been built into roller bearings for passenger cars by the Timken company.

Alloy Steels for the Chemical Industry

Still another major industry which is absorbing the new alloy steels in increasing amounts is the chemical industry, including such allied lines as petroleum refining, soap making and similar processing. The Halcomb Steel Co., Syracuse, N. Y., notes a rapid development in non-corrosive and heat-resisting alloys. Construction of new plants for making nitric acid and nitrogenous fertilizers has gone forward, plants of such size and using such processes as could hardly have been constructed of glass, stoneware or noble metals, as in the past. This has required the production of alloy steels for severe service which can be rolled, forged, riveted, or welded.

At the Steel Treaters' Show held in Philadelphia in 1920, Crucible Steel Co. of America exhibited in a very small way some newly developed steels of superior corrosion- and heat-resisting properties. In the intervening years these chromium-nickel-silicon steels called Rezistal have found so many uses that the production is no longer looked upon as a specialty. At the present exhibit the company will show some large-scale pieces of equipment, made from these alloys, in this manner indicating the important advances in chemical and other apparatus made possible by a combination of metals regarded as a laboratory curiosity only ten years ago.

Merchandising problems evidently increase as the variety of products and the number of outlets multiply. The Carpenter Steel Co. (among others) is meeting this situation by a rapid extension of warehouse facilities. Horace T. Potts & Co., Philadelphia, find so many customers who require not one but a dozen types of steel, that salesmen must be competent to appraise each situation, and tender sound advice on the individual needs. Customers' demands are also becoming more stringent, as to quality, uniformity, and prompt deliveries.

Developments in Steel Making Technique

Two notable events may also be recorded in steel making technique. The Ajax Electrothermic Corporation, Trenton, N. J., notes that a high frequency induction furnace of 1-ton capacity has been installed for melting high speed steel at the Edgar Allen Steel Co.'s works in Sheffield, England, and another is being installed by Jacob Holtzer & Co., in France. The Vanadium Corporation of America, New York, has also marketed a new deoxidizer, a carbon-free alloy of aluminum, silicon and iron, so proportioned that the products of reaction form a fusible aluminum silicate, readily eliminated in the ladle. It is said that the resulting steel is entirely free from harmful aluminum oxide or aluminum



Low Carbon Nickel Steel Casting, With Gates and Risers, a Main Side Frame for Large Locomotives, Meets Severe Specifications Required by Heavier Traffic

carbide inclusions, and is more uniform in soundness, toughness and machinability.

New and improved alloys have been placed on the market in the past year, as well as new uses found for old ones. A brief review, such as this, must treat such developments in a fragmentary manner—details can best be obtained at the exhibits of the steel companies. Perhaps the latest development is that announced by the Firth-Sterling Steel Co., McKeesport, Pa.—a high-carbon high-chromium steel to be marketed under the trade name Chromovan triple die steel. Such an analysis has been known to give superior life when made into dies, but the dies have been so hard and so difficult to machine that costs of die sinking have been almost prohibitive. By improved annealing and mill inspection, Firth-Sterling has produced Chromovan with hardness under 210 Brinell, and of an analysis which will either oil or air-harden, it is claimed, without warping and with negligible change in volume.

New Uses of Well Known Materials

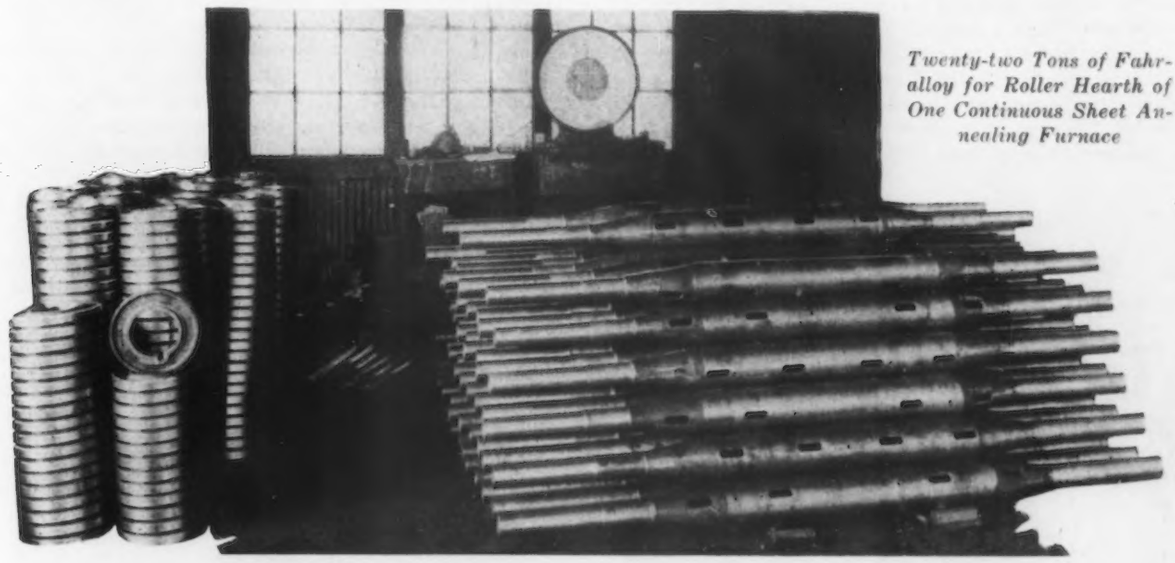
As an instance of new uses for well known materials, the Kinite Corporation, Milwaukee, calls attention to hobs and cams made of the air-hardening alloy steel known as Kinite. It states that as this metal holds its shape under heavy pressure, manufacturers of Bakelite and other molded products may make molding dies by pressing a Kinite hob into low carbon steel blocks. It is offered also as easily cast into cams, and in such form is especially useful for withstanding heavy pressures as in coining presses.

An interesting change in what had long been thought to be a standardized article has been effected by Heppenstall Forge & Knife Co., Pittsburgh. Since the first sheet metal was rolled, it has been trimmed to shape by shear blades made of high grade carbon tool steel. With the recent advent of the wide strip and the continuous sheet mill, it became apparent that the old style knife could not stand up under the punishment of such heavy production. To meet this need, blades made of acid open-hearth alloy tool steel have been developed, known as Kleenkut shear knives, described as giving greatly increased service between grinds.

An innovation which has caused much discussion among heat treaters during the last year is the method of case hardening special steels by exposure to ammonia gas at 950 deg. Fahr. American rights for this process are shared by the Ludlum Steel Co., Watervliet, N. Y., and the Central Alloy Steel Corporation, Massillon, Ohio. A special steel—usually high in aluminum—is used for this process, and a thin case, glass hard, is produced without quenching, and at a temperature where grain growth and distortion are avoided. Hardening by ammonia was patented some years ago by American Gas Furnace Co.

Materials for Heat-Resisting Uses

Several firms report activity in the field of heat resisting steels and alloys, largely used by steel treaters, among others, for carbonizing boxes and for automatic furnace parts. In the past the most attention has been paid to castings for such services, but the Halcomb Steel Co., Syracuse, N. Y., has been marketing metal which can be made into sheets, tubes and other rolled shapes, and suitable for fabrication into carburizing boxes and furnace muffles. Advantages claimed reside in the fact that a thinner wall, and consequently a more efficient heat transfer, may be made from sheet than from cast metal.



Twenty-two Tons of Fahralloy for Roller Hearth of One Continuous Sheet Annealing Furnace

The Allegheny Steel Co., Brackenridge, Pa., has also marketed quite successfully its most recent high-nickel, high-chromium steel known as Ascoloy 44. This can be furnished in castings as well as rolled shapes, and may be welded by either the gas or electric process. Thus a wide variety of furnace parts, heat resisting equipment, recuperators and heat exchangers may be fabricated readily.

A number of cast alloys have been successfully used for carbonizing boxes and furnace parts. It seems possible to get materials of this sort at a wide range of prices, each one having individual merit for certain services. The problem of selecting the alloy which will give the greatest return per dollar expended has become so complex that the General Alloys Co., Boston, has established an industrial survey division for studying it. The division is to function in two ways. First, to study existing installations of Q-alloys (the company's principal product), and second to study the conditions in the plants of prospective users.

The Bell & Gossett Co., Chicago, and an associated organization, the Case Hardening Service Co., Cleveland, have been marketing for eight months an alloy of nickel-chromium-aluminum known as Ni-Chro-Al. It is a low priced alloy, frankly admitted to be less durable than some of the more expensive alloys, but it is said to have replaced steel or malleable carburizing boxes with resultant economies.

That a considerable amount of heat resisting alloys enters into a modern furnace is obvious from a glance at one of the accompanying illustrations, representing 22 tons of Fahralloy shafts and disks for a single furnace. The

Southern Manganese Steel Co., St. Louis, patentee, have, by an improved design, been able to avoid the necessity of water cooling the alloy parts, forming the roller bottoms of sheet annealing furnaces. It is urged that this innovation saves fuel, avoids the expense of water and the cooling system, and increases the furnace output.

Developments in Furnaces and Fuel Applications for Them

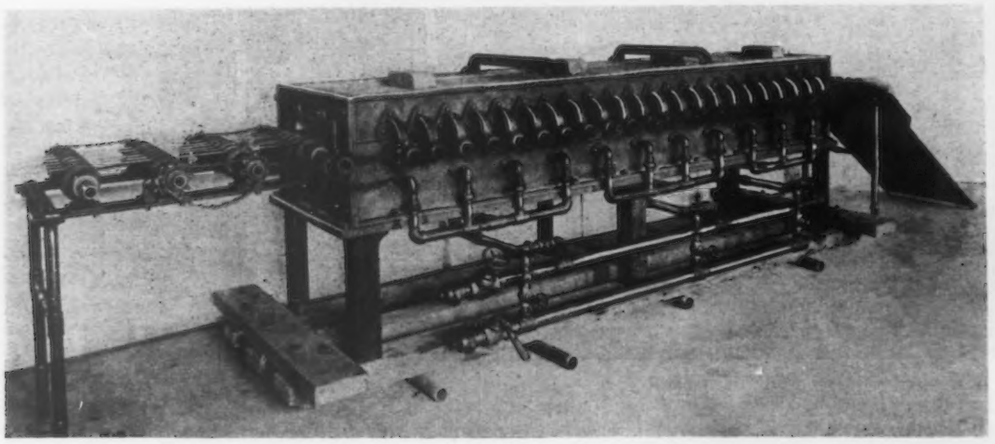
HEAT treating methods and equipment form the principal interest of the American Society for Steel Treating, and naturally the majority of the visitors at the National Metal Exposition will be attracted by novelties in these lines. As an attempt was made in the early part of this review of progress to measure recent advances in metal manufacture by contrasting the size of noteworthy bridges, so will E. F. Houghton & Co., Philadelphia, emphasize the advances in heat treating by contrasting the mediæval alchemist's den with a research and control laboratory, with its electric furnace, pyrometric control, physical testing equipment, microscope and X-ray machine. It seems a far cry from the cementation furnaces used only a century ago, requiring 21 days to convert wrough iron into steel, to the modern counter-flow recuperative furnace, carrying continuous rows of pots, full of mild steel parts, packed in special carburizing compounds, each pot completing the trip in as many hours. Holcroft & Co., Detroit, record notable developments in such furnaces as last mentioned, and build them either for city gas or for electric heat.

As a matter of fact, continuous heat treating furnaces have been available for 30 years, to a date back in the "dark ages" of heat treatment—at least for the present generation. One of the accompanying illustrations was dug out of the archives of the American Gas Furnace Co., Elizabeth, N. J., and it may be observed that this 1899 furnace has the essential elements of the up-to-date through annealer. The most recent development to be reported by this organization is an active interest in vertical furnaces for carburizing in a gas atmosphere. A notable installation is also here shown. The advantages are said to be a more uniform case, produced in a manner which avoids injury to carefully machined surfaces. When such work is slowly cooled, economy in heat and time may be had by using the new thermo-syphon heat exchanger. It consists of an insulated chamber big enough for two baskets of work, one hot from the furnace, the other cold.

Heat Treating in Gaseous Atmospheres

Other instances of new developments in heat treating by the use of gaseous atmospheres are the nitriding process, mentioned earlier in this article, and furnaces for heating in a hydrogen atmosphere. A fine example of the latter is that designed and built by General Electric Co., Schenectady, N. Y. Such furnaces are useful for hydrogen annealing of iron sheets for electrical purposes, or for making joints by the coppering process (as was fully described in THE IRON AGE for May 10, page 1305.)

A merry battle continues between the proponents of the various heating methods. Gas, oil and electricity each have their supporters, and doubtless an engineering analysis would select one fuel for one set of circumstances, and another for different conditions. It is probably true that the manufactured gas industry has recouped far more than its lost lighting load by intensively cultivating the possibilities of industrial heating. The Peoples Gas Light & Coke Co., Chicago, notes in the last year such outstanding examples as one plant of average size increasing its gas consumption over 50 million cu. ft. a year, and making large expendi-



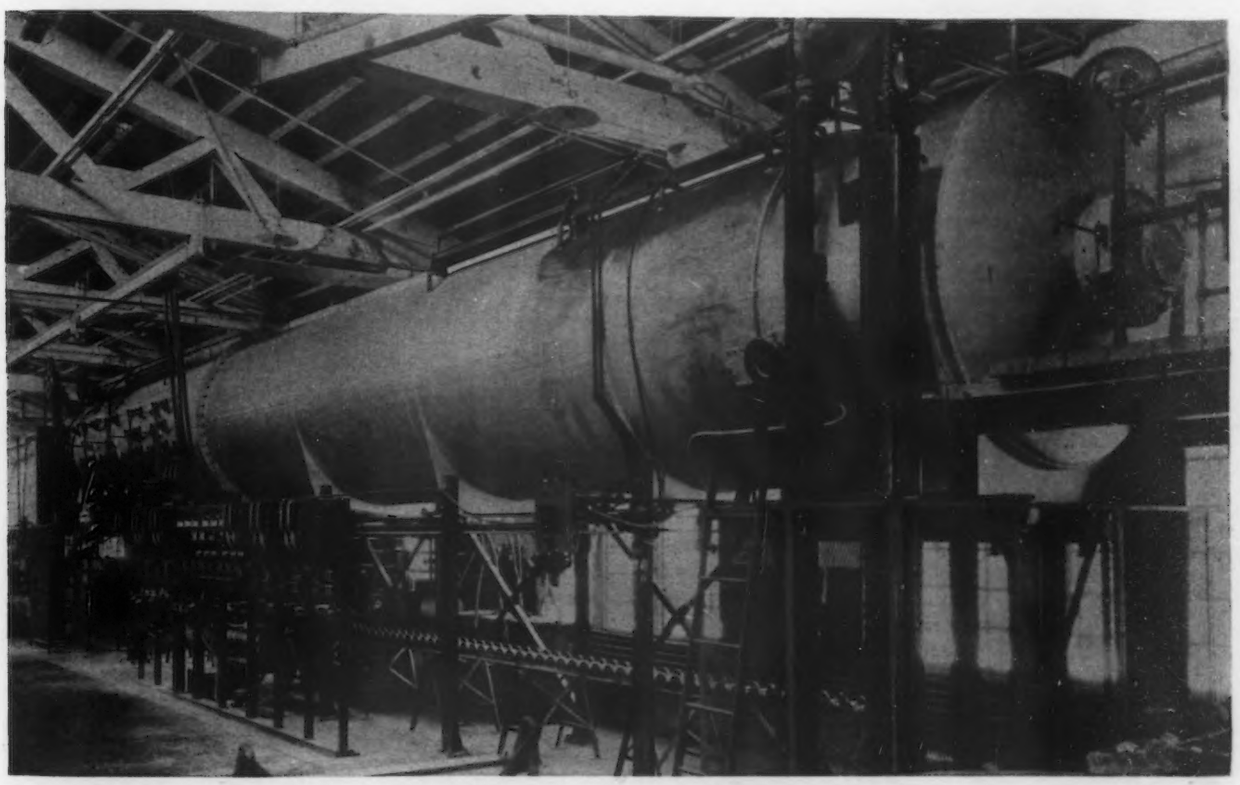
Continuous Strip Annealing Furnace, Built in 1899 for the Philadelphia Mint by American Gas Furnace Co., Contained Many Elements of Advanced Designs in 1928



A Basket of Rings Being Charged Into Vertical Furnace for Gas Carbonizing. Control of furnace atmosphere is given increased attention

tures in single pieces of gas-burning equipment. Single furnaces costing $20,000 are installed frequently; the largest noted in recent months cost $65,000.

The Surface Combustion Co., Toledo, Ohio, also visions an increase in interest in gas furnaces, but only if they are correctly designed and installed, and adequate for the intended duty. Past development work has occurred chiefly after cut-and-try experiments, and to avoid continuing this practice, the company has established research and development laboratories. The former inquires into the fundamental scientific basis of any proposed development, and the latter designs, constructs and experiments with the units before building the furnaces for the customer.



Pusher-Type Furnace for Heating Parts in Atmosphere of Hydrogen, Suitable for Bright Annealing or for Making Joints by "Coppering" Process (General Electric Co.)

Electrical Heat Applications

Electric heat has been used long enough for metal treating to establish a secure field. Aside from its ease of control, perhaps its outstanding advantage is the ability to place a furnace in a production line of precision tools, without the distractions of noise and exhaust gases. Consequently the most interesting things to report in the electric furnace field are heating applications of unusual size or unconventional service.

Thus, Hoskins Mfg. Co., Detroit, one of the pioneer builders, reports that the furnaces built today produce about 25 per cent more per kwhr. of current consumed than units in similar service built a few years back. Due to automatic features of heat control, charging and discharging, labor costs are sharply cut.

New designs for electrically heated pots are being vigorously pushed. The Harold E. Trent Co., Philadelphia, has recently marketed them for operating salt, cyanide or lead baths up to 1700 deg. Fahr. The feature of this design is a very narrow clearance between insulated casing and the pot, this annular space being occupied by a bent resistor of the grid type. Electric characteristics are such that no transformer is needed. The Sentry Co., Taunton, Mass., uses a nichrome ribbon, wound in double helix in such a manner that an almost continuous heating surface radiates to the pot wall. A special alloy drain tube is built into the base, to prevent drip from building up and short-circuiting the heating elements. In passing it might be mentioned that the Roessler & Hasslacher Chemical Co., New York, has developed a non-poisonous material known as R. & H. drawing salts, suitable for temperatures between 300 and 1100 deg. Fahr. It is thus suitable for heat coloring and low tempering, and is said to be non-hygroscopic and non-adherent to the hot metal.

A notable invasion of new fields by electric heat is made by the Electric Furnace Co., Salem, Ohio. A pit-type furnace of this make for annealing alloy steel bars is here shown, one of a group of six special furnaces recently installed by them for the Timken Roller Bearing Co. This furnace holds 50 tons of steel; the heater grids are protected at the sides by buffer beams. When loaded a 25-ton cover is placed and sealed with sand. Electric connections are adjustable for rapid heating, and then for soaking at constant temperature. After slow cooling through the critical range, further cooling in the furnace may be hastened by blowing air through a pipe labyrinth built into the brick walls of the pit. In this manner the time cycle is materially reduced.

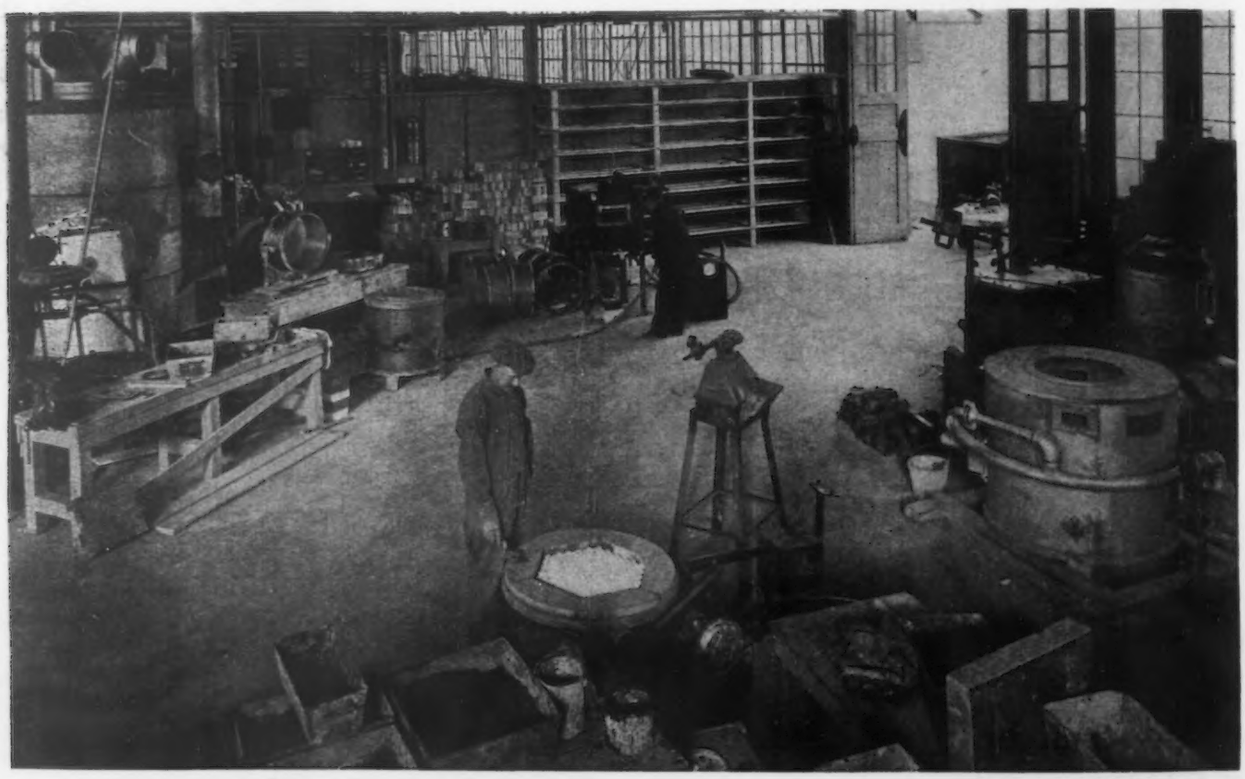
Electric heat is also being used for heating bars and billets prior to forging. Holcroft & Co., Detroit, are installing Globar non-metallic resistors in electric forges, both batch type and continuous. A wide variety of forge furnaces have been intensively developed by this company, and at present it is engaged in extended experimentation on a new gas-fired unit. Forges using either oil, gas or electricity have been developed to a high state of efficiency in recent years.

The Mahr Mfg. Co., Minneapolis, reports increasing in-

terest in modern labor saving heat treating devices in some branches of the metal working industry which have received little publicity. Thus, the Hughes Tool Co., Houston, Tex., maker of oil drilling machinery, has replaced a number of batch type furnaces with two continuous trains for semi-automatic operation. In each train three lines of forged tool joints are pushed slowly through a heating furnace, and quenched one by one in oil. A conveyor delivers these pieces to the drawing furnace; they are pushed through, quenched in water, and delivered by conveyor to Brinell hardness testing machines. Such equipment is expected not only to save labor, but to produce drill joints of highest quality and uniformity, and thus avoid expensive breakages down deep in the well. A sketch of part of this installation is given in the accompanying line drawing on the opposite page.

Furnace Auxiliaries and Control Apparatus

IT is only natural that developments in furnace design should be accompanied by corresponding improvements in the various details, auxiliary apparatus and control. Notes on heat resisting alloys, so necessary in the construction, have already been given in the first section of this review. Some auxiliaries like pyrometers have been well standardized in the past; models now on display differ only in details. An exception to the latter statement will be displayed by Thwing Instrument Co., Philadelphia, an in-



Development Laboratory of Surface Combustion Co., Where New Designs Are Studied and Perfected

closed type of radiation tube, containing a lens (with cleaning shutter) to focus the heat rays on a sensitive thermopile, and thus develop potential to actuate either an indicating or recording instrument. A perfected design of recorder, called Model 28, will be exhibited for the first time.

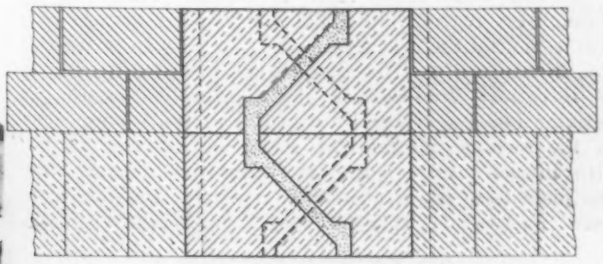
An accompanying illustration shows a permanently mounted radiation pyrometer in the tool department of Hess-Bright Mfg. Co. A radiation tube is contained in the square box, sighted through a hole in the side of the muffle directly upon the high speed steel being heated. To prevent the flare of hot gases, an air jet blows continually across the aperture. This control equipment operates indefinitely at temperatures up to 2500 deg. Fahr.

Controls for burners or heating circuits have been developed which possess almost human intelligence. The Automatic Temperature Control Co., Philadelphia, will have an operating furnace equipped with its "three-position balanced controller." Upon starting a cold furnace, such a controller opens valves at a predetermined rate to give a rapid heat, yet reduces the fuel supply gradually as the correct temperature is reached so as to avoid "overshooting." Slight changes in furnace temperature will cause slight corrective changes in fuel supply, but a large drain on the heat will cause a large increase in combustion rate. As in the heating stage, the valves are automatically regulated to prevent overshooting, even if a counter movement is required by the particular furnace. Compensation for controller and thermocouple lag may also be made.

Other devices are for controlling the operation of the furnace by the changes occurring in the heated metal—evidently a more direct matter than relying upon the temperature of one or more points in the furnace atmosphere. The Stanley P. Rockwell Co., Hartford, Conn., will exhibit the new remote control model of the Rockwell Dilatometer here reproduced. As may be well known, this device records the changes in expansion rate as steel is heated through the critical range. A quartz tube rests on the hot steel, and its movements up and down are transmitted and magnified by a simple lever and recording system. Heretofore the device could only be mounted directly over the furnace, but in the present modification, as shown in the view, changes in position of the quartz rod (at the left) cause



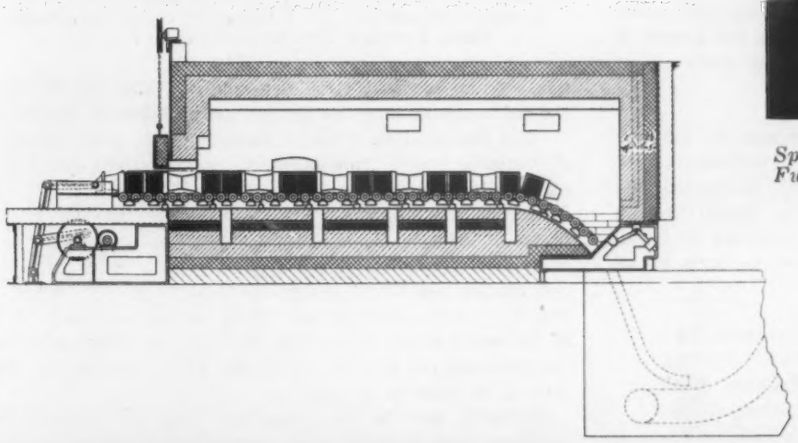
Furnace For Annealing 50 Tons of Alloy Steel Bars Built by Electric Furnace Co.



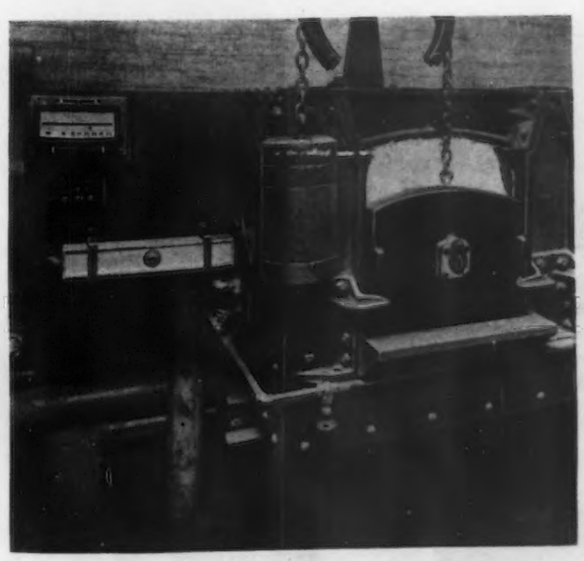
Expansion Joint Laid in Furnace Wall With Reintjes Tile



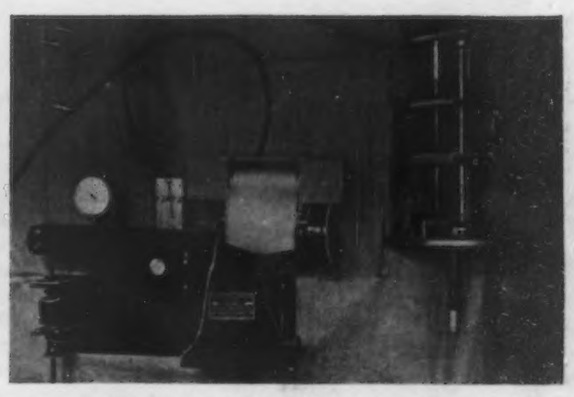
Spencer Turbo-Compressor of 3 Hp. Furnishing Air to Tool Hardening Furnaces



Gas Fired Furnace (at Left) Installed by Mahr Mfg. Co. as Part of Automatic Train For Heat Treating Oil Drilling Tools



Thwing Radiation Pyrometer for Control of High-Speed Furnace Up to 2500 Deg. Fahr.



Remote Control of Rockwell Dilatometer by Diaphragm Gages and Liquid Transmitter

changes in pressure in a closed liquid system, and are equally reflected by movements in the group of diaphragms at the recorder, the latter located at any convenient distance.

Carbon steels lose their magnetism when passing through the critical range, and this property may be utilized to control the heat treatment. The Hevi Duty Electric Co., Milwaukee, will demonstrate such equipment, known as Hevi-Duty Wild-Barfield electro-magnetic furnace. A detector relay, operated by windings in the soaking zone of the furnace, controls the pusher or conveyor mechanism in such a manner that at a given time interval after the piece loses its magnetism it is ejected from the furnace. Such a relay may also operate signal lights or bells.

New Refractory Equipment

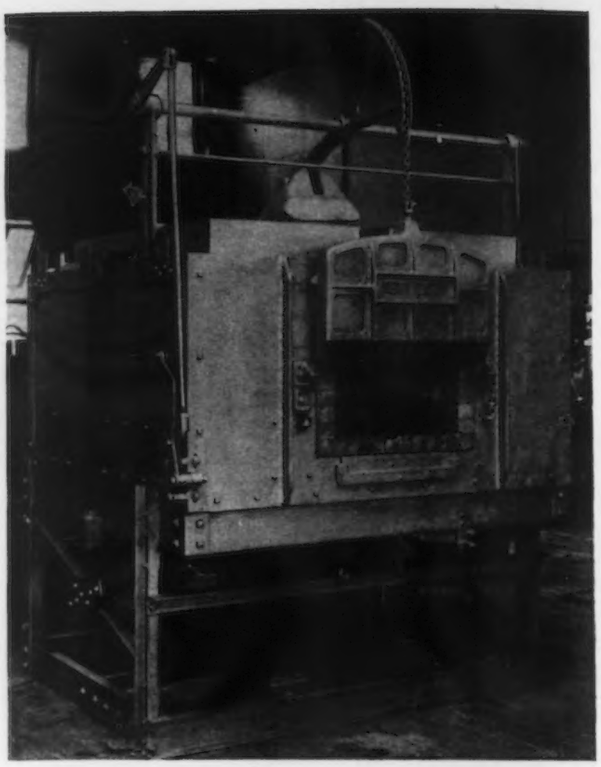
Several manufacturers of refractory materials will offer developments in this department. The Armstrong Cork & Insulation Co., Pittsburgh, has marketed an insulating brick for equipment operating at temperatures up to 2500 deg. Fahr. It is thus applicable to high speed and melting furnaces which would cause excessive shrinkage or spalling of the older insulators made of diatomaceous earth.

The George P. Reintjes Co., Kansas City, will exhibit new shapes of corner bonding and expansion joint tiles illustrated in the drawing here reproduced. It builds readily into the brickwork, and by merely turning one of a pair over, it makes a corner joint, well keyed, yet allowing expansion clearance. Interlocking flat arch tiles requiring only three shapes have also been devised.

The Botfield Refractories Co., Philadelphia, has produced Adamant-Adachrome, a refractory cement especially adapted for facing and patching brickwork by means of a "gun" which sprays the slurry against the wall.

Various Furnace Auxiliaries

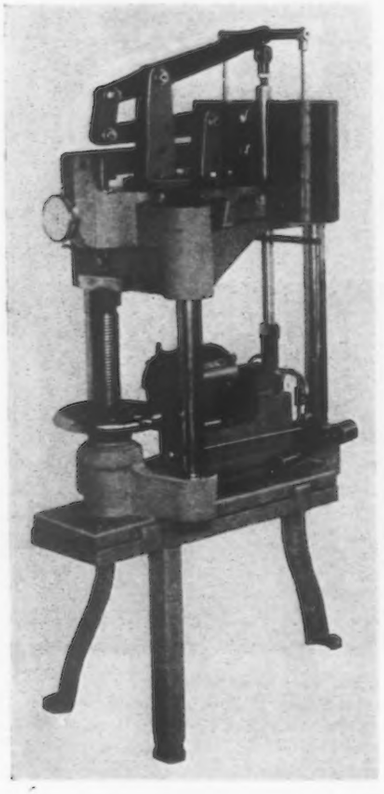
Other exhibitors of furnace auxiliaries are the Sullivan Machinery Co., Chicago, which exhibits gas compressors for boosting the pressure of the fuel supply as needed, and the Spencer Turbine Co., Hartford, Conn., which finds a considerable fraction of its output being absorbed by builders of heating and heat treating furnaces to burn oil or gas. While most of them are small in size, as shown in the cut, units as large as 150 hp. are required at times.



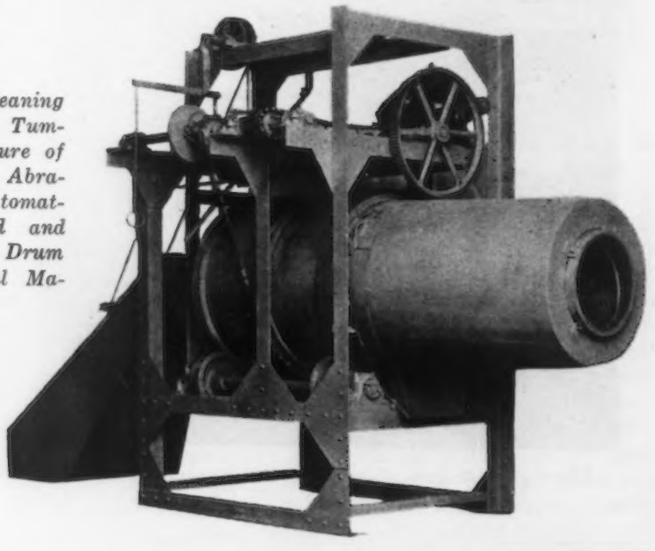
Near the Floor May Be Seen a Reeves Variable Speed Transmission for Controlling Speed of Round Plate, Forming Bottom of Electric Furnace

The Reeves Pulley Co., Columbus, Ind., manufacturers of variable speed transmissions, reports that many furnace builders provide this adjustable device on continuous furnaces. An illustrative installation is on the baking ovens of Atwater Kent Mfg. Corporation. Various sizes of radio cabinets are in production, and in order to secure the proper results it is necessary to vary the speed of travel, closely controlled according to the size and design of the metal ware. One of the illustrations shows a Reeves transmission for driving the round plate forming the bottom of an electric furnace.

Turning now to the important duty of cleaning and handling heat treated work, several firms will be found exhibiting machines and chemicals for such purposes. The J. B. Ford Co., Wyandotte, Mich., finds that the phrase "chemically clean" must be literally interpreted by those



Precision Brinell Testing Machine, With Automatic Cycle of Loading, Holding and Release (Pittsburg Instrument & Machine Co.)



Machine for Cleaning Metal Parts by Tumbling in a Mixture of Stars and Sand. Abrasive material automatically Separated and Returned to the Drum (Ideal Industrial Machinery)

engaging in chromium plating, and has expended much time and energy in discovering the best combination of materials and processes for this class of work.

Cleaning equipment as represented by tumbling barrels will be exhibited by the Ideal Industrial Machinery, Cincinnati. One of the pictures shows a machine which tumbles metal parts in an equal quantity of stars and sand. This proportion serves to prevent collision between the forgings, and to produce a finish on them hardly distinguishable from a sand blasted surface. Work is loaded by power in batches. When the finish is correct, the direction of rotation is reversed. The stars and sand are automatically screened out, returned to the tumbling compartment, and the forgings discharged at the open end.

Testing Equipment for Controlling Production

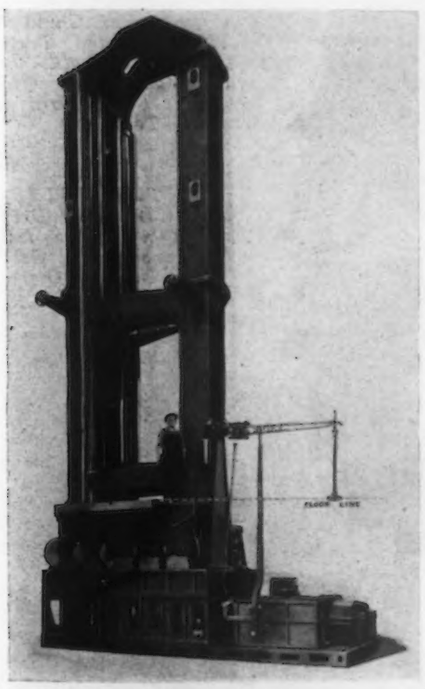
HARDNESS testing for the control of production is becoming more and more the vogue, and for that reason at least three firms will exhibit new types of machines operating on the Brinell principle. The Molybdenum Corporation of America, Pittsburgh, will have a Vickers hardness testing machine, particularly adapted to test the nitrided steels in which the exhibitor is greatly interested. This machine was described in detail in THE IRON AGE for March 1, page 602.

The Pittsburg Instrument & Machine Co., Pittsburgh, has just placed on the market a precision machine whereby the correct rate of loading, maintenance, and release is automatically controlled. It has been found that most errors in hardness measurement occur through hastening one or more of these three stages. In this new machine these operations are controlled in a fixed cycle by a motor-driven cam and lever system. The system of weights and levers shown in one of the pictures insures a high degree of accuracy in the load.

A production type of Brinell machine will be demonstrated by Tinius Olsen Testing Machine Co. It is motor driven, all moving parts are under forced lubrication, and it may be operated continuously without undue effort by the operator. A more rapid machine built under the Johnson patent will be shown for the first time, as well as the Herbert Cloudburst tester and hardener, wherein the surface of metal may be gradually work hardened to a high degree by the increasing impact of a shower of steel balls.

The Riehle Brothers Testing Machine Co., Philadelphia, will exhibit a diversified line of physical testing machines, but are proudest of the 2,000,000-lb. tension machine recently placed in operation at Roebling's. This machine, a photograph of which is here reproduced, is installed primarily to proof test loops of full-sized suspender cable, 25 ft. long, made for the new Hudson river bridge. It is said to be the largest universal testing machine in existence, and could pull apart a 6-in. billet of structural steel. Special recoil apparatus is required to absorb the shocks at sudden breakage of a specimen under test, and to avoid damage to the knife edges. Despite its capacity and size, the sensitivity is such that the balance responds to a slight pressure of the hand.

An innovation in metallographic equipment known as the Metallurscope may be seen in the exhibit space of E. Leitz, Inc., New York. It may be seen to be a self-contained optical system, somewhat portable yet accurate, and designed for industrial laboratories where high powers are not needed, or for inspection purposes in the shops. The

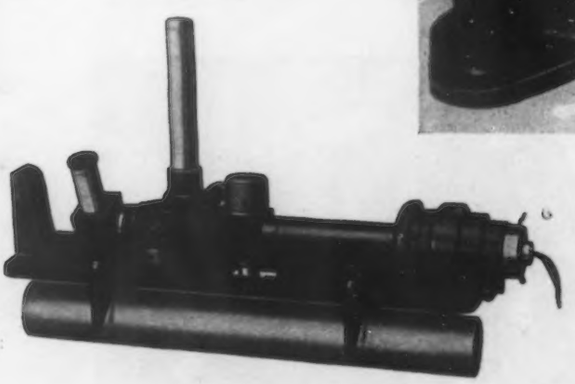


Riehle Testing Machine, Installed at Roebling's for Hudson River Bridge Work, Could Pull Apart a 6-In. Bar of Structural Steel

Motor Driven Brinell Machine for Inspection Purposes (Tinius Olsen Testing Machine Co.)



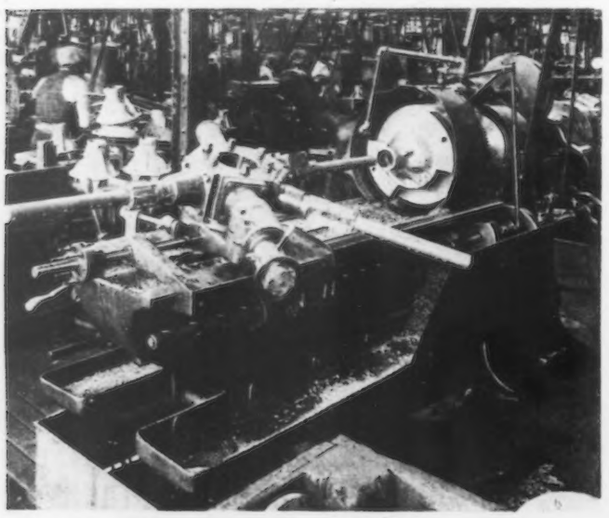
Leitz Metallurscope, Mounted So As to Examine Surface of Round Bar



view shows it mounted on vee blocks for examining the surface of a round bar. When clamped to a rail on a table top, with the objective turned in a vertical direction, and a stage attached to the upright bar, smaller specimens may be examined in the usual way. A camera box may also replace the eyepiece for photography.

Metal Cutting Tools and Fixtures

COMPETITIVE conditions in the metal trades are so exacting that manufacturers find themselves driven to economies which in less strenuous times would have been given little thought. A new method of fabrication that may only reduce the amount of scrap is given serious consideration. Increasing accuracy and interchangeability is often demanded, even of minor parts, and this throws back a more and more severe demand for limited tolerances on the machines, and increased accuracy on the tools. Labor costs must be reduced by driving machines to the limit of endurance, and getting the maximum out of the tools, jigs and fixtures. Exhibitors in the machine tool section at the Commercial Museum, even though presenting a wide variety of equipment, all emphasize these recent trends in production.

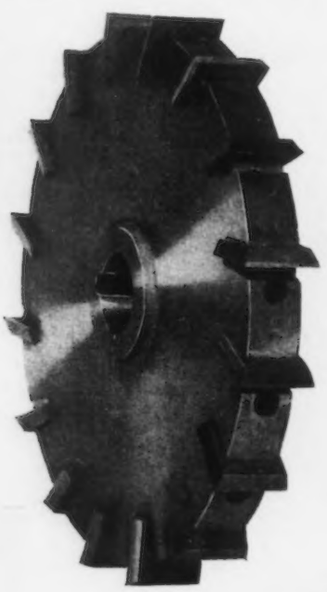


Turret Lathe Tooled With Rugged Multiple Cutters to Work Machine and Part at Maximum Speed



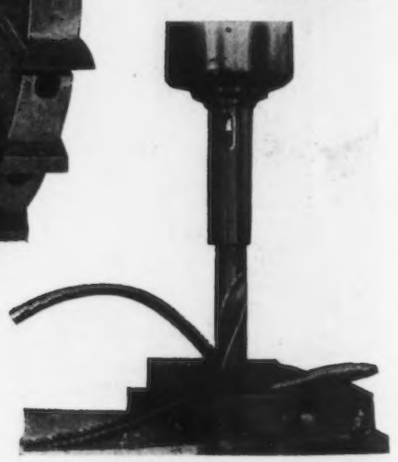
Pels Gate Shear With Rolled Steel Plate Frame Cutting ¾-In. Plate, 8 Ft. Wide, at Egleston Brothers & Co., Long Island City

The Kelly Reamer Co., Cleveland, emphasizes that the machine tool is no better than the cutting units furnished it. Multiple cutting tools of rugged design, adjustable to compensate for wear, are necessary to attain full production. An accompanying illustration shows a Gisholt machine tooled by the Kelly company upon the above theory. While this view does not show the peak of multiple cutting at the same time, it does show the ultimate which can be reached upon this piece, as only three positions are taken for boring and reaming, giving two boring cuts and a finish ream. The reaming bar in the fourth position for finish reaming two diameters simultaneously is especially notable, for it does the work which ordinarily would require a double position for small tolerances.



Close-Up of Cutter With Inserted Teeth, Adjustable Both Out and Sideways (National Twist Drill & Tool Co.)

Morse Twist Drill (Below) Capable of Drilling 13½ Inches Into Manganese Steel Castings With One Grind



This same idea of rigidity and adjustability for wear is featured by the Union Mfg. Co., New Britain, Conn., in its line of lathe, drill and planer chucks, and by the National Twist Drill & Tool Co., Detroit. A cutter with inserted teeth made by the latter firm is here shown. One side of the slot is covered with tiny pyramids which match the serrations clearly shown on the back of the blades. The locking wedge and set screw then holds these inserted teeth securely in the correct position, even when working at very high feeds.

Drills for Cast Manganese Steel

The Morse Twist Drill & Machine Co., New Bedford, Mass., has achieved what has long been regarded as impossible, namely, a tool which will cut high manganese steel castings. High speed drills turning at 12 r.p.m., with 0.003 in. feed crumble on the cutting lips after drilling ¼ in. into

such metal. A ¾-in. hole might be drilled in 100 min. by a hardened and untempered carbon steel drill, after five grinds. One picture herewith shows the new drill running at 50 r.p.m., with 0.0075-in. feed. Nine 1½-in. holes were drilled with one grind.

Another exhibit of the extra heavy duty demanded of present-day tools will be found in that of Henry Pels & Co., Inc., New York. Its line of punching and shearing machines, with main frames made of steel plate, includes the gate shears designed along the lines shown in an accompanying cut, with a capacity of a 12 ft. x 2 in. plate. During the past year a line of heavy presses has been developed, using the same steel plate frame construction.

Rugged Machines for High-Speed Saws

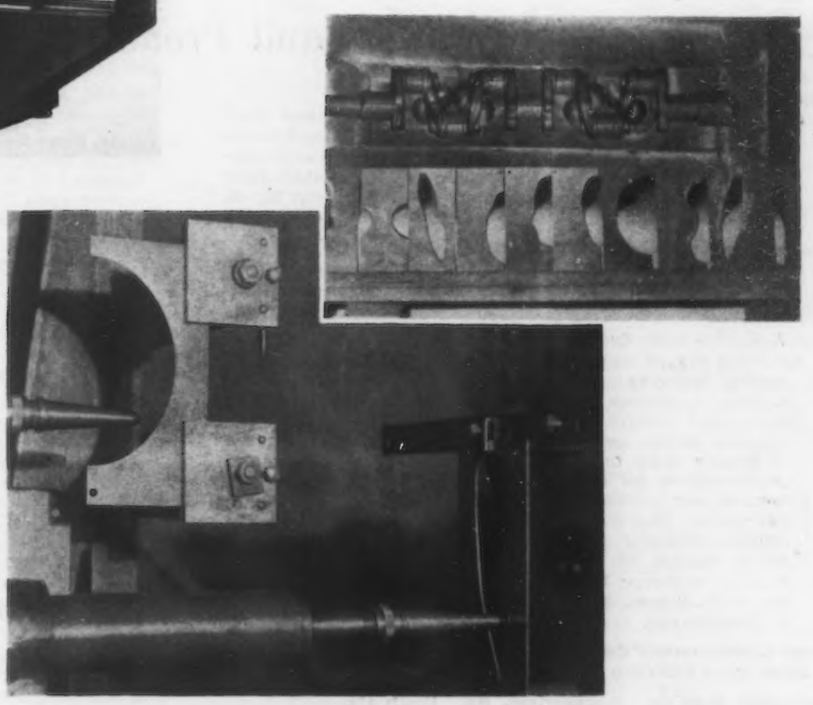
Real progress is apparently being made in the field of metal sawing, lifting it into a speedy, economical, almost



Above Is a Zeiss Measuring Machine Capable of Reading to 0.00001 Inch

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At Right Is Indicated Method of Controlling Keller Die Cutting Machine by Two Tracers, the Upper Guiding the Cross Sectional Travel of the Tool, and the Lower the Outline. At the upper right is an inset illustrating a forging die for a crankshaft, cut by use of the sheet metal templates shown



a precision operation. This has been effected by the combination of improved saw blades of alloy steel and rigid sawing machines.

E. C. Atkins & Co., Indianapolis, will have a display of "Silver-Steel" hacksaw blades, said to be the first line of genuine high-speed steel made commercially in the United States. L. S. Starrett Co., Athol, Mass., will show a line of high-speed saw blades developed and placed on the market in recent months.

The Atkins company and Peerless Machine Co., Racine, Wis., will also feature modern hacksaw machines. The latter are characterized by saw blades mounted across the center of square frames, instead of across the top of an open U. This construction provides rigidity to stretch the new blades at that high tension required for rapid traverse and heavy cuts. The saw frame is also guided in upper and lower ways, and the work clamped in substantial vises or on angle fixtures, so the operator is enabled to cut metal to very close dimensions, and on occasion to use the equipment to block out dies and punches.

Die making machines, and precision units for tool rooms will also be in evidence in the machine tool section of the Steel Treaters' show. Marburg Brothers, Inc., New York, will show a line of imported labor saving filing and sawing machines for punch and die work. The process consists of laying out the shape on a slab or plate of suitable steel, drilling a small hole alongside the cut, sawing along the line with a finely set saw, then replacing the saw with a file and filing on the machine until a perfect fit is secured to the template.

Precision Equipment for Tool Rooms

The Keller Mechanical Engineering Corporation, Brooklyn, N. Y., will demonstrate the latest developments in the control of die cutting machines by combined use of two tracers for work with cavities of three dimensions. An accompanying cut illustrates the two-tracer method, the upper tracer controlling the cross section and the lower the outline. By this means complete models for the dies are no longer necessary, they being replaced as shown in the illustration just below by a series of templates cut out of metal 1/32 in. thick.

Jig borers of Swiss manufacture may be seen at the exhibit of the R. Y. Ferner Co., Washington. While this particular machine is built primarily to drill holes with center lines precisely parallel, it also has a universal tilting table by means of which holes may be bored at any angle in the piece, and to notably close accuracy of angle and location.

Another high precision instrument in the form of a 40-in. measuring machine will be shown by George Scherr Co., Inc., New York. It is manufactured by the German optical firm, Carl Zeiss, and is said to have an accuracy of 1/20,000-in. over the range. Head stocks and tail stocks are adjustable in 4-in. steps, and located by glass marks imbedded into the frame of the machine. After the piece to be measured has been properly mounted, readings to the nearest 0.005 in. are made by the rear microscope, viewing a graduated glass rule. Subdivisionr to 0.00001 in. are then estimated through the forward eyepiece, called the optimeter, with optical system in line with the piece to be measured, a detail which is required for highest accuracy.

Steel Treaters' Exhibit Opens Oct. 8

Commercial Museum, Philadelphia, Will House Displays of Nearly 250 Companies Prominent in the Making, Working, Treating and Fabricating of Steel

NEARLY 250 companies will be represented by exhibits at the annual convention of the American Society for Steel Treating to be held at the Commercial Museum, Philadelphia, the week beginning Monday, Oct. 8, to be known as the second annual National Metal Week. It is estimated by the society that fully 25,000 metallurgists, executives and others interested directly in the metal industry will attend. The American Welding Society and the Institute of Metals are participating in the event with the American Society for Steel Treating.

The National Metal Exposition will be housed in the Commercial Museum, which has 80,000 sq. ft. of available exhibit space. The exhibits will represent the metal working, fabricating and treating industries, as well as the making of steel. A list of the exhibitors, together with the products they will exhibit, is given below.

List of Exhibitors and Products They Will Show

Abrasive Co., Philadelphia. Booth 221.
High Speed swing frame grinder snagging steel castings demonstrating Red Center high-speed wheels of Borolon bakelite grinding wheel segments; bricks, sticks and stones. Represented by: R. A. Shaffer, vice-president; S. M. Hershey, sales manager; J. F. Fischer, assistant sales manager; W. A. Ruppel, L. R. Burnes, W. B. Ilko, I. R. Blair.

Acme Electric Welder Co., Philadelphia. Booth 130.
A 6 kw. spot welder; a 35 kw. spot welder with a 48-in. throat; also a butt welding attachment. Represented by: George M. Hessdoerfer.

Air Reduction Sales Co., New York. Booths 129 and 131.
Airco 99.5 oxygen and Airco acetylene in cylinders, Airco D-B oxygen discharge manifold, Airco D-B welding and cutting torches, regulators and supplies; the Radiagraph, motor driven and portable, for oxyacetylene cutting of steel plate, forgings, billets, risers, etc.; No. 4 Oxygraph, a new machine of greater scope than the No. 2 Oxygraph, with structural improvements, for oxyacetylene cutting of light and heavy sections and production shapes; first showing of new No. 2 Camograph, improved and cutting area extended, for reproduction cutting of shapes from steel plate. Represented by: W. W. Barnes, W. H. Eliason, A. T. Walker, C. D. Trout, W. L. Humphreys, H. B. Hand, C. S. Peters, W. H. Ludington, H. L. Rogers, A. H. Yoch, Fred Judelsohn, F. E. Rogers, G. Van Alstyne, J. J. Crowe.

Ajax Electrothermic Corporation, Trenton, N. J. Booth 34.
High speed induction heat treating furnace.

Allegheny Steel Co., Brackenridge, Pa. Booth 118.
Samples of Allegheny metal products and sheets, bars, tubes, etc., of high heat-resisting Ascoloy. Represented by C. B. Calomon, manager of alloy sales; P. M. Otte, L. W. Hostettler and W. R. Murphy, engineers.

Edgar Allen Steel Co., Inc., and A. Milne & Co., New York. Booth 300.
From A. Milne & Co.: FJAB tool steels, die steels, hollow die steels; AMCOH hollow die steel; FJAB hollow drill steel, Auger drill steel, special sections; MR Lancashire iron and electrical iron; Prince ball bearing steel and ball wire; S. & C. Wardlow, Ltd., cutlery sheets, gin saw sheets, hack saw sheets, and file sections; NOHAB anvils; and FJAB hammers. From Edgar Allen Steel Co., Inc.; Imperial Major high-speed steel, extra special high-speed steel, and special high-speed steel; turning and finishing steels; Minerva air-hardening steel, self-hardening steel and special chisel steel; Red Label steel; tack knife steel; die-casting steel; Solid Double Six production steel; hollow Double Six production steel; class P tool steel; class E tool steel; Stag drill steel; and Talon drill steel. Represented by Henry Sears Hoyt, member A. Milne & Co. and president, Edgar Allen Steel Co., Inc.; J. King Hoyt, Jr., member of A. Milne & Co. and secretary-treasurer, Edgar Allen Steel Co., Inc.; V. A. Greene, vice-president and general manager, Edgar Allen Steel Co., Inc., and sales manager, A. Milne & Co.; R. P. Rice, G. K. Boland, A. E. Van Stone, E. R. Carnell and H. R. Adams, salesmen.

American Brass Co., Waterbury, Conn. Booth 97.
Complete line of Anaconda copper alloy welding rods; a demonstration of oxyacetylene welding by Charles Gallo (expert welder) using Tobin bronze filler rods, an exclusive product of American Brass Co.; Everdur (manganese-silicon bronze) also on display in the form of sheets, rods, tubes, castings, wires, bolts, rivets, etc. Represented by: A. M. Dinkler, C. W. Swift, W. H. Dowd, W. J. MacLean, John Becht, G. M. Hurlbut, J. H. Larmett, C. M. Saltsman, D. E. Hotchkiss.

American Car & Foundry Co., New York. Booth 24-A.
Berwick electric rivet heater and Berwick electric forging heater. Represented by: F. C. Cheston, John S. Helt.

American Gas Association, New York. Booths 1 to 14, 35 to 50.
Latest developments in gas-fired heating furnaces, including practically all types of combustion systems; completely outfitted metallurgical laboratory showing latest improved automatic sample polishing machine, hardness tester and micrometallographic microscope. Represented by: D. W. Chapman, chairman American Gas Association Committee on Display at Industrial Exhibits, and members of this committee including H. S. Christman, A. P. Apmann, R. B. Burr, E. B. Dunkak, E. W. Rowand.

American Gas Furnace Co., Elizabeth, N. J. Booth A. G. A. section.
One of new, large size, rotary retort carburizing machines having a capacity of 1000 to 1250 lb. of work per charge. As in the smaller machines the retort is of highest grade heat resisting alloy. The furnace lining is practically monolithic and is backed by 9 in. of insulation. Individual motor drive is provided for rotating the retort and tilting and a small hoist is provided for handling the retort cover; a small rotary carburizing machine, capacity 75 to 100 lb. of work; also other furnaces. Represented by: P. C. Osterman, vice-president; John Mehrman, Gustav Schwab, Theodore Farwick, Sr., Elmer C. Cook, F. W. Hornbruch.

American Manganese Bronze Co., Philadelphia. Booth 263.
Specimens of manganese-bronze castings.

American Metallurgical Corporation, Boston. Booths 65 and 66.
Following new models of the American electric furnaces: HB-1 20 kw. 8 x 16 in. high-speed (temperatures up to 2400° F.); P-1 8 kw. 6 x 10 in. salt; B-2 15 kw. 12 x 24 in. tool room furnace; lead, salt or cyanide pots and box furnace for carburizing, hardening and annealing. Represented by: K. A. Juthe, president; S. N. Juthe, vice-president; A. J. Hanson, chief engineer; John C. Juthe, sales manager; A. B. Beach, L. A. Smith, A. D. Heath, E. E. Bolds, A. A. Anderson.

American Steel & Wire Co., Chicago. Booth 98.
Welding wire.

Ampco Twist Drill Co., Jackson, Mich. Booth 244.
Two automatic drilling machines requiring approximately 50 sq. ft. and weighing combined 10,000 lb.; display board of

drills and reamers. Represented by: George Melling, inventor of machines; Oscar Monrad, president; W. E. Loy, general manager; F. J. Sikorovsky, superintendent; G. G. Chapman, David O'Brien, Mr. McCumber.

Armstrong-Blum Mfg. Co., Chicago. Booth 203.
No. 8 Marvel metal band saw,—a fully universal metal saw for cutting off bar stock, for tool room and die work, for miscellaneous cutting of pipe, structural shapes, formed mouldings, etc., both straight and miter cuts; No. 5 Marvel automatic high-speed saw,—a fully automatic production cutting-off machine which has been increased in weight, has larger bearings and other improvements; No. 4 Marvel high-speed hack saw. Represented by: Harry J. Blum, secretary; G. L. Hunt, S. A. Woleben.

Armstrong Brothers Tool Co., Chicago. Booth 201.
Lathe, planer and shaper tools, lathe dogs, "C" clamps, ratchet drills, drop forged wrenches, pipe tools. Represented by: Horace Armstrong, secretary; A. F. Arbogast, G. L. Hunt.

Armstrong Cork & Insulation Co., Pittsburgh, Pa. Booth 24.
Armstrong's and Nonpareil insulating brick for furnaces, ovens, etc.; high pressure covering and blocks for steam equipment; cork covering for refrigerated lines; corkboard for cold storage rooms, insulation of residences and the roofs of buildings. Represented by: H. B. Gates, S. L. Barnes, John R. Livezey.

E. C. Atkins & Co., Indianapolis. Booth 220.
No. 4 metal cutting bandsaw machine; No. 18 Kwik-kut power hacksaw machine; No. 7 Kwik-kut power hacksaw machine; Silver-steel hacksaw blades. Represented by: Edward S. Norvell, W. H. Sherer, L. C. Garvin.

Atlas Steel Corporation, Dunkirk, N. Y. Booth 77.
Chrome bearing steel products; stainless iron and steel products; cold header dies and products; fractures of the principal brands of tool steel; L-XX high-speed steel forgings. Represented by: A. F. Dohn, president; F. B. Lounsberry, vice-president and works manager; C. P. Burgess, vice-president; W. H. Wills, W. R. Breeler, Gustaf Peterson, S. B. Matthews, James Malloy.

Automatic Nut-Thread Corporation, Philadelphia. Booth 178.
Automatic nut tapping machines.

Automatic Temperature Control Co., Philadelphia, Pa. Booth 174.
Motor-operated valves controlling fuel and air to industrial furnaces; other control devices. Represented by: J. D. Andrews, sales manager; C. Wilhjelm, G. H. Johanson, G. S. Frazee, R. A. Smart, R. C. Lawlor.

B

W. O. Barnes Co., Detroit. Booth 191.
Barnes Red Arrow high-speed steel hack saws. Represented by: W. O. Barnes, president; J. H. Flavell, secretary-treasurer; F. M. Shaw, William Gross, C. G. VanTuyl, R. Schindler, C. B. Cecil.

Bastian Blessing Co., Chicago. Booth 128.
Complete line of welding and cutting equipment, including new approved portable acetylene generator and oxygen manifold. Represented by: E. L. Mills, sales manager; E. N. Stevens, assistant sales manager.

Bausch & Lomb Optical Co., Rochester, N. Y. Booth 216.
Metallographic equipment with several new improvements, as well as the contour measuring projector for inspection of screw threads, gear forms, etc.; the toolmaker's microscope for the checking of screw threads, measurements of small parts, etc.; also microscopes for the inspection of raw and finished products, and other optical tools of general interest to manufacturers in the metal working industry. Represented by: J. A. Ccheick, J. I. Wexlin, W. L. Patterson, I. L. Nixon, E. H. Anthes.

Bellevue Industrial Furnace Co., Detroit. Booth 68.
Several small heat treating furnaces. Represented by Walter E. Hinz, president; Louis J. Raymo, sales manager.

Bellis Heat Treating Co., Branford, Conn. Booth 72.
Lavite for hardening, tempering, annealing; new electric Lavite furnace. Represented by: A. E. Bellis, J. W. Black, R. C. Jordan.

Bethlehem Steel Co., Bethlehem, Pa. Booths 111 to 114.
A display of various grades of Bethlehem tool steels and Bethlehem stainless steel; an exhibit of alloy steels including an operating exhibit of silico-manganese spring steel; a display of interesting types of forgings and castings; structural steel sections; miscellaneous finished products illustrating the application of various grades of steels. Represented by: R. S. Tucker, manager of sales alloy steels; W. R. Shimer, metallurgical engineer; Henry Wysor, metallurgical engineer; A. P. Spooner, engineer of tests; H. G. Walton, general manager of sales; G. F. Hocker, manager of sales forgings, castings, etc.; D. C. Roscoe, manager of sales tool steels; E. A. Buxton, assistant superintendent tool steel department; G. P. Witteman, tool steel development engineer; H. C. Bigge, superintendent tool steel department; T. G. Foulkes, assistant research metallurgist; W. C. Hartman, assistant research metallurgist; A. McDonald, assistant research metallurgist; E. R. Long, superintendent central tool department; W. B. Kennedy, manager of sales Philadelphia district; J. H. Stoll, M. W. Dalrymple, W. E. Titus, W. S. Lippincott, H. E. Graffin, E. H. Jamison, H. R. Weeman, J. D. Codding, G. A. Cushman.

Blax Flexible Shaft Co., New York. Booth 286.
Portable flexible shaft machines, flexible shafting, portable grinders, portable sanding machines, die sinking and rotary filing machines. Represented by: R. Wezel, president; F. I. Vanderbeek, vice-president; G. M. Vanderbeek, secretary-treasurer; and from Riter Brothers, M. Buehler and Mr. Riter.

G. S. Blakeslee & Co., Cicero, Ill. Booth 299.
Blakeslee Niagara and pump type metal cleaning equipment for cleaning all kinds of stamped and machined parts, removing the oil, grease, dirt, chips, etc., prior to inspection, assembling, painting, etc. Represented by: G. R. Blakeslee, president; J. W. Dammers, secretary; A. T. Nogrady.

Charles Bond Co., Philadelphia. Booth 176.
Gas welding and cutting apparatus manufactured by Torchweld Equipment Co., Chicago; the new Reeves variable speed transmission, manufactured by Reeves Pulley Co., Columbus, Ind. Represented by: W. A. Slack, president Torchweld Equipment Co.; Charles Irwin, Reeves Pulley Co., sales engineer; T. A. Bergen and L. R. McKean, Charles Bond Co., sales engineers; C. Carter Bond, managing director Charles Bond Co.

Botfield Refractories Co., Philadelphia. Booth 59.
Adamant fire brick cement; Adachrome and Adachrome fines; the Adamant gun; Adapatch, plastic patching material. Represented by: Axel H. Engstrom, sales manager; L. B. Botfield, W. B. Smith, S. C. Lott, Joseph J. Sweeney, A. J. Wittwer, W. E. Tierney, Charles C. Phillips.

H. Brinton Co., Philadelphia. Booth 309.
Special machined parts, raw materials for all classes of manufacturing. Represented by: John Leafstrom, Elmer Nicholson, Wilfred Vaughan, Harry Doenges.

Bristol Co., Waterbury, Conn. Booth 21.
Bristol recording and indicating instruments, also electric controllers and motor operated control valves. Represented by: H. L. Griggs, general sales manager; H. W. Moss, G. H. Gaites, I. F. Inderdohnen, J. H. Ferguson, E. R. Wyatt.

D. P. Brown & Co., Philadelphia and Detroit. Booth 277-A.
Teon, a waterproof, oil and acid-fume proof belt that is not injured by heat up to 300 deg. Fahr.; Brown's woven endless belts, that have no end; Sprucolite, a new pulley, made of compressed spruce. Represented by: John McCauley, W. E. Warren, F. R. Andrews.

Brown Instrument Co., Philadelphia. Booth 116.
Pyrometers, flow meters, thermometers, automatic control valves, thermocouples, portable instruments, etc. Represented by: G. W. Keller, sales manager; J. P. Goheen, secretary; L. M. Morley, W. H. Lukens, K. R. Knoblauch.

Brown Lynch Scott Co., Monmouth, Ill. Booth 228.
Screening machine for cleaning and grading carburizing compound. Represented by: W. B. Lynch.

Budd Manufacturing Co., Edward G., Philadelphia. Booth 168.
Automobile metal stampings.

C

Andrew C. Campbell, Inc., Bridgeport, Conn. Booth 264.
Various sizes of nibbling machines in operation. One recent interesting adaptation of this machine was made for trade using slotted tubes, especially oil burner manufacturers.

Carborundum Co., Niagara Falls, N. Y. Booth 31.
A general display of abrasive material, including crankshaft wheels for roughing and finishing, Aloxite Redmanol cam wheels, tool room wheels, internal grinding wheels, centerless wheels, etc., Carborundum and Aloxite polishing grain, abrasive paper and cloth. Represented by: S. F. Courter, general sales manager; W. J. Griffin, district sales manager, Philadelphia; G. E. Chorman, Boyd Work, A. H. Prey, G. T. Kretschmar, E. C. Maguire, H. L. Henszey, J. F. Brady.

Carborundum Co., Perth Amboy, N. J. Booth 33.
Model demonstrating method of applying Carboradiant combustion chambers to car type annealing furnaces; model of

Carborundum recuperator; model of wire annealing furnace, equipped with a Carborundum arch between the combustion and annealing chambers; Carborundum and Aloxite super refractories for high temperature installations; insulating Infrax refractory fire brick; various grades of high temperature cements. Represented by: C. E. Hawke, sales manager; John G. Fritzinger, F. W. Miller, R. A. Beverley, C. A. Dutton, S. A. Fenno.

Carpenter Steel Co., Reading, Pa. Booth 171.
Various articles made of Carpenter stainless steels, showing definite applications of the five grades of Carpenter stainless steels now on the market. Represented by: F. A. Bigelow, president; J. H. Parker, vice-president; R. V. Mann, F. R. Palmer, J. E. Sharp, E. P. Pyewell, B. H. DeLong, G. V. Luerssen, P. B. Greenawald, W. H. Kemper, W. M. Loos, G. H. Edmunds, J. B. Guthrie, R. L. Williams, C. A. Heil, H. J. Joyce, Jr., C. W. Olsen, K. L. Crickman, W. O. Steele, R. Calvert, H. B. Gaylord, V. B. Fisher.

Case Hardening Service Co., Cleveland. Booth 117.
Hardening room materials and equipment: Bohnite, carburizing compound; Caseite, cyanide hardening compound; Cyanide, all grades; Drawite, drawing salts, range 300 deg. to 1200 deg. Fahr.; Bathite, hardening salts, range 1200 deg. to 1700 deg. Fahr.; Ni-Cro-Al, nickel-chromium-aluminum alloy pots and boxes; Cleancoat, lead pot covering; Non-Case, anti-carburizing plant; pressed steel pots; B & G oil coolers. Represented by: W. C. Bell, president; E. J. Gossett, vice-president; J. S. Ayling, sales manager.

Celite Products Co., Los Angeles, Cal. Booth 52.
Sil-O-Cel heat insulating materials with especial attention to Sil-O-Cel C-3 which has recently been used widely for the construction of complete ovens as well as furnace doors and bases, and is often applied with a cement gun as a veneer insulating course on regenerator walls, etc. Represented by: Frank C. Coe, Fred H. Emerson, Angelo Gossman, E. S. Crosby, vice-president and sales manager.

Central Alloy Steel Corporation, Massillon, Ohio. Booths 158-159.
Agathon alloy steels, Enduro stainless iron, Toncan copper mo-lyb-den-um iron, Agathon nitralloy. Represented by: B. F. Fairless, president; J. M. Schlendorf, vice-president in charge of sales; W. M. Garrigues, assistant general manager of sales; M. J. R. Morris, D. B. Carson, C. C. Willits.

Char Products Co., Indianapolis. Booth 200.
Char carburizing compound, a case hardening material in which the energizing substance is sealed within each grain of compound by a shell of carbon. The product is characterized by low shrinkage, low dusting loss and constant activity with very small amounts of new material added to the mix. Also Char lead pot carbon, Char annealing carbon and Char calcined carbon. Represented by: William Higburg, sales manager; C. B. Edwards, C. Q. Swenson.

Chicago Pneumatic Tool Co., New York. Booth 211.
Pneumatic tools, electric tools, "Hicycle" electric tools, Uniloy jointless rotor. Represented by: A. E. Goodhue, vice-president; A. M. Brown, T. P. Harris, L. J. Walker.

Chicago Steel Foundry Co., Chicago. Booths 75 and 76.
Pyrasteel carburizing pots and boxes; pots for lead, salt and cyanide; conveyor chain, hearth plates, pusher plates and grids, oil burner equipment; parts fabricated from Pyrasteel sheets and samples of Pyrasteel sheets. Represented by: David Evans, president; William J. Chapin, George J. Jeffrey; J. N. Bourg, of Park Chemical Co., Detroit, agent; George O. Desautels, Indianapolis, agent.

Chrobaltic Tool Co., Detroit. Booth 288.
High Duty alloy castings for resisting heat, acid and for electrical resistance purposes. Represented by: W. B. Sullivan, vice-president; L. H. Whiteside, C. M. Conner, J. M. Mull, A. A. Cash, Louis Eitzen Co., Murdock Company, Premier Machine Co.

Cleveland Twist Drill Co., Cleveland. Booths 265, 266, 267, 268.
Two high-speed drill presses demonstrating Cle-Forge high speed drills at various speeds and feeds; also a display of complete line. Represented by: H. G. Smith, F. M. Hoelzle, O. B. Hansen, G. Burkhardt, W. C. Weidig, R. G. Berrington, E. Horan, T. Thomas, H. P. Jenson, H. A. Baier, T. Skove, D. Burdett.

Climax Molybdenum Co., New York. Booth 163.
Molybdenum ore as it occurs, together with the concentrates produced from the ore and all the forms in which it is prepared for use by the iron, steel and industrial trades. The display includes various exhibits of commercial products employing molybdenum in their manufacture. Represented by: B. F. Phillipson, president; F. C. Langenberg, vice-president in charge of research; J. B. Thorpe, W. P. Woodside, and R. L. Rolf.

Clipper Belt Lacer Co., Grand Rapids, Mich. Booth 197.
Complete Clipper line consisting of all models of belt lacers, belt fasteners or hooks, belt cutters and connecting pins. Represented by: Carl P. Field.

Coats Machine Tool Co., New York. Booth 283.
Krupp line of Mikrotast gages; Elasticometer spring testing machine; Prestometer micrometer fluid gages; Coats hand tachometers; Coats divided machine vises; Skallnot, scale preventive. Represented by: Charles E. Coats.

Colonial Steel Co., Pittsburgh. Booths 279 and 280.
Complete line of products, including high-speed and carbon tool steels in both bars and sheet stock; tool steel forging products such as blocks, rings and special forgings; also a number of fractured specimens in both the cast and heat treated conditions. Represented by: Lawrence Wood, general sales manager; T. H. Nimick, assistant general sales manager; H. C. Poole, assistant general sales manager; N. B. Hoffman, chief metallurgist; A. C. Muller, C. M. Stevenson, E. L. Earley, E. A. Carlston.

Cooper Hewitt Electric Co., Hoboken, N. J. Booth 170.
Represented by: C. F. Strebig, sales manager; D. R. Grandy, R. B. Chipman, W. R. Flounder.

Crucible Steel Co. of America, New York. Booths 184, 185, 187 and 189.
Various grades of high-speed steel, special machinery steel, alloy and carbon tool steel, cold drawn specialties, stainless iron and steel, and non-corrosive steels. Represented by: F. B. Hufnagel, president; J. A. Mathews, vice-president; A. T. Galbraith, vice-president; J. M. McComb, vice-president; H. L. Gellinger, auditor; R. Michener, general sales agent; R. E. Christie, W. K. Krepps, J. P. Jayme, E. P. Gaffney, R. H. Heatley, J. W. Barnett, F. J. Dawless, W. H. Plage, Allan Fraser, C. E. O'Connor.

D

Danly Machine Specialties, Inc., Cicero, Ill. Booths 243, 245.
Die sets, standardized and "special"; leader pins, bushings, die shoes, punch-holders, dowel pins, pry bars, goose neck clamps, swivel head cap screws, automatic stock stop for punch presses, hollow head cap and set screws, pressure pad springs, fillister and socket head, stripper bolts, laps and lap arbors, and Danly transparent die set templets. Represented by: P. H. Danly, vice-president and general manager; A. G. Guilberg, A. L. Miller, H. F. Bitzer, C. F. Schonmann, M. W. Rouse, A. F. Wallace, J. R. Fitzsimmons.

Darwin & Milner, Inc., Cleveland. Booth 225.
Alloy tool steel with particular reference to non-deforming alloy die steels, either oil-hardening or air-hardening for maximum quantity production; form tool castings from patent Cobaltcrom steel; patent Cobaltcrom steel safety razor blades, etc. Represented by: Victor F. J. Tlach, president; John R. MacCracken, H. L. Harrison.

Dearborn Chemical Co., Chicago. Booth 231.
No-ox-id, chemically compounded rust preventive; No-ox-id-ized wrapper; powdered cleaners. Represented by: E. M. Converse, sales manager; C. A. Remsen, C. I. Loudenback.

Henry Disston & Sons, Inc., Philadelphia. Booth 274.
Steel and hack saw machine in operation, using the new Disston high-speed steel machine hack saw blades. Represented by: S. Horace Disston, vice-president; H. A. Baxter, manager of steel sales; J. C. Forrest, Ed. Ludy.

Donner Steel Co., Buffalo. Booths 173 and 175.
Cold drawn material and parts made therefrom. Represented by: W. F. Vosmer, vice-president; J. W. Donner, general superintendent; A. G. Greenamyer, assistant general superintendent; C. A. Cherry, assistant to vice-president. District managers as follows: H. G. Uphouse, Philadelphia; E. D. Pumphrey, Detroit; P. M. Guba, New York; H. C. Richardson, Cleveland; R. E. Sherlock, and W. C. Peterson, metallurgical engineers; L. C. Miller, J. W. Percy, F. H. Lammert and N. F. Tisdale from the metallurgical department.

Driver-Harris Co., Harrison, N. J. Booth 30.
Cast Nichrome in form of carburizing containers, retorts, muffles, furnace parts, etc.; Nichrome grade B, an addition to cast iron for tougher, stronger and harder iron easily machined; new development of Nichrome sheet boxes for carburizing. Represented by: H. D. McKinney, general sales manager; G. A. Lennox, assistant sales manager; J. B. Shelby, W. E. Blythe, J. C. Bilek, J. C. Henderson.

Duriron Co., Inc., Dayton, Ohio. Booth 169.
Complete line of Duriron and Alcumite pickling equipment including exhaust fans, Duriron circulating steam jets, Duriron centrifugal pumps for unloading acid, Alcumite sheet, Alcumite tie rods, Duriron pipe, valves and fittings. Represented by: W. E. Pratt, sales manager; P. C. Lewis, E. B. Thacker.

E

Eastman Kodak Co., Rochester, N. Y. Booth 271.
X-ray films and accessories for use in radiographic examination of metals. Represented by: E. E. Smith and A. W. Fuchs.

Eclipse Fuel Engineering Co., Rockford, Ill. Booth A. G. A. section.
New Design 7 hp. type D steam boiler complete with automatic pump unit and condensation receiver; ½ hp. boiler, miniature; 4 hp. type C boiler with No. 4 feed water regulator and automatic fuel cut-off; No. 2 lead hardening furnace complete with low pressure gas burners; No. 3 high-speed steel furnace with No. 1 high pressure proportional mixer, new design base complete with burner equipment for high-pressure blast steam boilers; automatic core oven burner; centrifugal blowers, No. 2311, No. 2515, No. 6815 two stage mounted; new design series C controller mounted in connection with No. 4615 blower for demonstration; display of pressure steel and pressed alloy pots; single and compound injectors, burners, burner tips, inspirator type burners, etc.; demonstrating unit for new type tunnel burners with cooling wells, connected to 10-lb. gas line; No. 5 rivet heater with high pressure proportional mixer; and No. 3621 blower with 5 hp. 220 a.c. motor for furnishing air. Represented by: O. M. Olsen, Walter Frederick, D. A. Campbell, J. M. Traugott, L. B. Maximon, G. W. McKee.

Electric Furnace Co., Salem, Ohio. Booth 70.
Electric heat treating furnaces and equipment for all purposes; literature, information, and illustrations of unusual and interesting electric furnace installations; engineering representatives available for consultation. Represented by: R. F. Benzinger, vice-president; F. T. Cope, chief engineer; A. H. Vaughan, assistant chief engineer; R. D. Thomas, E. P. Larkin, F. J. Peterson, S. Floyd Keener, T. B. Bechtel, N. H. Knowlton.

Electric Steel Founders' Research Group, Chicago. Booths 304 and 306.
High grade steel castings, small and medium sized. Represented by: R. A. Bull, director, and C. N. Ring, assistant director, Electric Steel Founders' Research Group, Chicago; A. C. Jones, research engineer, Lebanon Steel Foundry, Lebanon, Pa.; and David Zuege, research engineer, Sivyer Steel Casting Co., Milwaukee.

Electro Alloys Co., Elyria, Ohio. Booths 119 and 120.
Thermalloy castings for use in construction of furnaces, combustion chambers, carbonizing pots, oil burner parts, resistance grids and steel mills. Represented by: A. L. Garford, president; W. C. Whyte, vice-president; J. B. Thomas, treasurer; J. W. Henry, metallurgist; A. M. Miller, Jr., H. P. Miller and W. J. Hansen.

Electro Refractories Corporation, Buffalo. Booth 293.
Silicon carbide brick, in various shapes; high temperature cement; and Mag-NO-Spall brick. Represented by: L. U. Milward, president; C. A. Asher, representative.

Elkon, Inc., New York. Booths 142 and 144.
Elkonite dies and some accomplishments by their use. Represented by: G. N. Sieger, vice-president; J. A. Weiger, Eddie Bremer, J. T. Cox, George H. Rockey.

Endicott Forging & Mfg. Co., Inc., Endicott, N. Y. Booth 272.
Drop forgings for automotive, tractor and general engineering industry. Represented by: S. J. Marshall, president; T. B. Kelday, superintendent; George B. Reed and J. I. Smith.

F

Falls Electric Furnace Corporation, Buffalo. Booth 71.
Electric box-type furnace using Falls former full radiating sheet type units; photographs, sample unit sections and refractories. Represented by: H. J. McCauley, president; J. R. Eves, vice-president and sales manager; C. M. Adams, H. E. Trent, J. V. Calhoun.

R. Y. Ferner Co., Washington. Booth 202.
Latest model of No. 5 high precision locating and jig boring machine demonstrating the use of a universal tiltable table for boring oblique holes or making small box jigs; micro-indicators tubes and supports for measurements of steel balls, rings, blocks, and other metal parts, or as an accurate indicator in the assembling of machine tools or set-up of work on machines; high precision bench micrometers. Represented by: R. Y. Ferner, representative; Charles T. Ameel, demonstrator; Ernest Stucky, demonstrator; John Cetrule, sales engineer; Nicholas Cetrule, sales engineer; and Peter Seibel, sales engineer.

A. Finkl & Sons Co., Chicago. Booth 162.
Recent developed applications of hot work die steel and drop forge supplies. Represented by: Charles E. Finkl, general manager; Fred Finkl, William Finkl, J. C. Vance, E. H. Graham, J. M. Curley, N. H. Rieger and T. P. Wallace.

Firth-Sterling Steel Co., McKeesport, Pa. Booth 167.
Steels. Represented by: L. Gerald Firth, general manager; D. G. Clark, director of sales; Robert S. Stevick, works manager; G. J. Comstock, director of research; O. K. Parmiter, metallurgical engineer; A. S. Martin, C. G. Thoma, A. E. Barker, O. T. Smith, H. I. Moore, E. T. Jackman, G. A. Jacobs, W. C. Royce, W. J. MacFarland, J. V. Little, R. F. Kimber, F. N. Mead, I. Olsen, Harry Jarvis, Fred Jarvis, G. R. Bunting, J. Johnson, W. A. Ruppel.

J. B. Ford Co., Wyandotte, Mich. Booth 229.
Wyandotte metal cleaners. Represented by: B. N. Goodell, W. M. Cole, George J. Lawrence and W. P. Scott.

Frew Machine Co., Philadelphia. Booth 275.
No. 1 Frew automatic tapping machine and No. 4 motor-driven saw bench. Represented by: George H. Frew, Jr., H. Edwards.

Fusion Welding Corporation, Chicago. Booths 135 and 137.
Fuzon 300-amp. motor generator arc welder in operation and Weldite welding rods, including Green Surfaced rod, Yellow Jacket rod and Blue Streak rod. Will weld up sections of pipe using special method of copper backing weld so as to improve tensile strength of finished weld, and will then pull specimens with Tinius-Olsen tensile strength testing apparatus. Also new portable gas engine driven outfit mounted on wire automobile wheels with pneumatic tires. Represented by: J. B. Green, president; F. B. Toombs, sales manager; E. J. Shuler, D. C. Giles, R. W. Holt and F. A. Green.

G

Gairing Tool Co., Detroit. Booth 165.
Types A, B, C and interchangeable counterbores, types C and F core drills, multiple operation tools with solid and inserted blade, inserted blade boring heads, chucking reamers, grinding fixtures and counterbore sets. Gairing full floating holder and Gairing nose drive reamer are shown for first time. Represented by: E. Gairing, president; C. E. Wyrick, chief engineer; B. O'Meara, D. J. Normoyle and E. T. Gropler.

Gathmann Engineering Co., Baltimore. Booths 259 and 260.
Split ingots of different sizes cast in several types of molds, demonstration of effect of mold designs on solidification, and revised edition of "Big-End-Up versus Big-End-Down." Represented by: Emil Gathmann, president; G. A. Dornin and Mark Gathmann.

General Alloys Co., Boston. Booths 148 and 149.
Q-Alloy heat treating containers; carburizing and annealing boxes, cyanide, lead and salt pots, tubes and retorts, dipping baskets; Q-Alloy and X-ite furnace parts, retorts, muffles, rails, hearths, Hump furnace fixtures; Q-Alloy bars, sheet, forged bolts, fabricated shapes, oil still parts, special valve parts, etc. Q-Alloy Link-Belt chain. Represented by: H. H. Harris, president; W. K. Leach, general manager; George C. McCormick, chief engineer; Fred Blaney, general superintendent; W. R. Blair, R. A. Alger, J. C. Van Arman, R. M. Kirk, Ralph Hare, A. L. Grinnell, J. J. Donovan, W. A. Toohill, A. D. Heath, H. G. Chase.

General Electric Co., Schenectady, N. Y. Booths 53, 54, 55, 56, 57 and 58.
Electric furnaces, electric welding machines. Represented by: C. F. McLoughlin and others.

Gibb Welding Machines Co., Bay City, Mich. Booth 102.
Model 436 HDA seam welder, model 312 automatic welding press, 300 amp. Zeus air cooled arc welder, and type SS-12 spot welder. All except type SS-12 spot welder new additions to line. Represented by: W. H. Gibb, president; C. E. Shearer, advertising manager, and R. D. Thomas, C. M. Rusk, A. M. Taylor and E. P. Larkin of R. D. Thomas & Co., eastern sales agents.

Globar Corporation, Niagara Falls, N. Y. Booth 29.
High-temperature electric furnace equipped with Globar Elements in operation at 2400 deg. Fahr., and furnace equipped with latest type self-cooled terminal. Represented by: A. H. Heyroth, general manager; K. E. Rogers, assistant sales

manager; E. Hediger, plant superintendent, and B. A. Bovee, H. N. Berry, S. Evans and A. Pfau, Jr.

Goodell-Pratt Co., Greenfield, Mass. Booth 209.
Electric drills and precision tools. Represented by: F. W. Pratt, C. L. Jernberg and Lee Fluke.

Goss & De Leeuw Machine Co., New Britain, Conn. Booths 194 and 196.
6-in. multiple spindle chucking machine, threading type, motor drive; and an 11-in. multiple spindle chucking machine, threading type, motor drive; exhibited for the first time. Represented by: Stanley T. Goss, president; Val. C. Hart, J. J. Spring, H. J. Hauck, E. H. Peck.

H

George J. Hagan Co., Pittsburgh. Booths 60 and 62.
Information concerning furnace installations using coal, gas, oil or electricity, together with blueprints and other general operating data. Represented by: R. E. Talley, president; C. F. Cone, A. D. Dauch, J. L. Edwards, J. Sandberg and V. A. Hain.

Halcomb Steel Co., Syracuse, N. Y. Booths 186 and 188.
Airplane motor and starter parts, non-corrosive and heat resisting products, and tool and alloy steels for special purposes. Represented by: F. B. Hufnagel, president; A. T. Galbraith, general manager of sales; S. T. Harleman, assistant sales manager; H. A. Pardee, general manager; H. J. Stagg, S. C. Spalding, J. T. Leyden, H. Barlow and A. Fraser.

Harrington Co., Philadelphia. Booth 261.
Chain hoists, trolleys, and allied products, 1-ton electric hoists. Represented by: Roger Sherron, president; A. M. Harrington, treasurer; R. E. Bishop, sales manager; W. J. Somerset, David Black.

Hartford Machine Screw Co., Hartford, Conn. Booth 246.
Special screw machine products, cap screws, nuts, taper pins and set screws. Represented by: William C. Walsh, L. M. Church and P. M. Mueller.

C. I. Hayes, Providence, R. I. Booth 28.
Improved type Globar furnace for hardening high-speed steel and preheating and high-speed furnaces, equipped with full automatic temperature control and special attachment for controlling atmosphere in furnace chamber during heating. Represented by: C. I. Hayes, chief engineer, and J. E. Hines, sales manager.

THE IRON AGE will have Booth 183 at the Steel Treaters' Exposition. Representatives of the editorial, advertising and reader service departments will be in attendance, and copies of THE IRON AGE will be on file.

Haynes Stellite Co., Kokomo, Ind. Booth 143.
Stellited wearing parts and method of applying Haynes Stellite to wearing surfaces using oxy-acetylene blowpipe. Represented by: W. A. Wissler, metallurgist; A. V. Harris, G. E. Wilson, A. S. Shiffert.

Heppenstall Forge & Knife Co., Pittsburgh. Booth 195.
24-in. and 10-in. octagonal ingot split through center, showing quality of steels made in company's 18-ton acid open-hearth furnaces; small model shear in actual operation, showing shear knives as manufactured by company. Represented by: C. W. Heppenstall, president; B. B. Weinberg, general sales manager; C. J. Sauer, manager Heppenstall Forge Co.; A. J. Porter, Jr., sales manager Heppenstall Forge Co.; J. A. Succop, D. A. Stuart, G. I. Allen, F. C. Moyer, A. L. Wurster, L. A. Daines, C. G. Singleton, G. O. Desautels and O. W. Mueller.

James H. Herron Co., Cleveland. Booth 61.
Industrial furnaces, including model of company's new continuous conveyor belt furnace, in operation but not heated. Represented by: James H. Herron, president, and Oscar C. Trautman, furnace division engineer.

Hevi Duty Electric Co., Milwaukee. Booth 67.
General line of electric heat treating furnaces. Represented by E. L. Smalley, president; F. A. Hansen, general manager; W. B. Cooley, sales manager.

Hisey-Wolf Machine Co., Cincinnati. Booth 334.
Electric tools as follows: Drills, screw drivers, nut setters, tool post grinders, angle plate grinders, combination external and internal grinders, vertical spindle grinders, bench grinders, floor grinders, bench buffers, floor buffers, combination disk and production grinders and portable grinders. Represented by: H. W. Wallace, J. W. Friedlander, W. J. Holtmeier.

Holcroft & Co., Detroit. Booth 84.
Continuous forging furnaces and continuous heat treating furnaces. Represented by: C. T. Holcroft, president; R. T. Cadwell, vice-president; H. L. Ritts, secretary and treasurer; C. H. Martin, C. E. Barba, C. L. Joy and A. Ruckstahl.

Hoskins Mfg. Co., Detroit. Booth 69.
New type electric heat treating furnace, alloy castings, chromel resistance alloys and thermo-couples and laboratory furnaces and hot plates. Represented by: W. D. Little, sales manager; W. A. Gatevard, F. L. Limmerman, G. L. Price and C. S. Kinnison.

E. F. Houghton & Co., Philadelphia. Booths 121 to 124.
Represented by: George W. Pressell, W. A. Buechner, W. J. Wright, J. Coleman Bentley, E. H. MacInnis, E. C. Barlow, E. W. Bock, C. H. Reiss, C. G. Schultze, H. C. Finck, Fred J. Ramsey, Arthur Jenner, W. I. Schwarz, F. R. Dieterich, D. J. Richards, C. H. Schultz, Raymond W. Justice, John T. Taylor, C. H. Stonerod, J. Weber, H. Seward, F. A. B. Harris, F. V. Armato and John D. Powers.

Hydraulic Tool Works, Philadelphia. Booth 310.

I

Ideal Industrial Machinery, Cincinnati. Booth 153.
An Ideal 36 x 60 in. Star return tumbling barrel with power loader and motor drive; photographs of a number of special installations. Represented by: C. A. Albrecht, George Walsh, N. Ransohoff.

Illinois Steel Co., Chicago. Booths 204 and 205.
Products manufactured by customers from steel produced by company, electric furnace model and photographs of company's alloy mill. Represented by: W. I. Howland, Jr., Assistant general manager of sales; A. L. Meyer, R. Korsan, C. R. Moffatt, R. G. Glass, F. S. Crane, E. Davidson, F. B. Mulvaney, H. McKeown, George Landrus, A. R. Williard, C. A. Parsons, H. G. Daley, C. F. Ramer and F. T. McCue.

Illinois Tool Works, Chicago. Booth 177.
New shear cut gear roughing hob, standard line of metal cutting tools and demonstration of Shakeproof lock washers. Represented by: J. M. Gribbie, P. J. Nelson and S. O. Bjornberg.

International Nickel Co., Inc., 67 Wall Street, New York. Booth 219.
Typical applications of nickel and nickel alloys, including nickel steel, nickel cast iron and other nickel-bearing ferrous and non-ferrous alloys. Represented by: F. S. Jordan, sales manager; F. A. Wheeler, assistant sales manager; E. J. Bothwell, nickel department; A. J. Wadhams, manager, development and research department; and P. D. Merica, assistant manager, development and research department; T. H. Wickenden, Charles McKnight, D. M. Houston, J. S. Vanick, F. B. Coyle, J. W. Sands.

J

Jessop Steel Co., Washington. Booth 237.
Stainless steels and irons, cold-rolled products and bar steel and sheet products. Represented by: S. A. Grayson, president; F. T. H. Youngman, secretary and treasurer; A. G. Lambert, metallurgist; R. M. Paxton, L. R. Samuels, J. C. Dawson and F. T. Morgan.

William Jessop & Sons, Inc., New York. Booth 152.
Represented by: Fred C. A. H. Lantsberry, director of William Jessop & Sons, Ltd., Sheffield; Robert Ross, secretary; G. J. MacQuarrie, A. L. Magilton.

Jones & Laughlin Steel Corporation, Pittsburgh. Booth 230.
Hot rolled and cold finished Jalcase steel and parts made therefrom; various shapes; cold finished bars; light weight channels and junior beams; new section of steel sheet piling. Represented by: W. B. Todd, manager of sales cold finished department; H. W. Graham, general metallurgist; T. C. Ham, Philadelphia district sales manager; C. S. Bradley, general manager of sales; A. A. Wagner, assistant manager hot rolled department; J. D. Allen, J. S. Grumbling, J. H. Flaherty, W. R. K. Scott, metallurgists, and William Miller.

Jones Machine Tool Works, Inc., Philadelphia. Booth 223.

C. M. Kemp Mfg. Co., Baltimore. Booth A. G. A. section.
Various types of burners and furnaces operating from the Kemp automatic gas system; special furnaces to demonstrate the exclusive features of the improved Kemp system; internally fired lead baths, open flame burners and special

display of gas burning under water. Represented by: Elmer B. Dunkak, sales manager; W. M. Ponder, William Hunt.

K

K-G Welding & Cutting Co., Inc., New York. Booth 88.
Style K oxygen and acetylene regulator, and styles A and M welding and cutting torches. Represented by: W. D. Flannery, H. H. Kress and A. W. Carr.

Keller Mechanical Engineering Corporation, Brooklyn. Booths 297 and 298.
Type BL-2416 Keller automatic tool room machine, demonstrating milling of blanking dies and punches from thin metal templates and forming of dies from cement masters; Kellocater complete unit, with base and overarm and spindle; R-6 Keller cutter and radius grinder, and line of Kellerflex machines. Represented by: P. C. Renno, Henry Schreiber, Harry Reichert and H. P. Loewenberg.

The J. W. Kelley Co., Cleveland. Booth 82.
Machine for washing and quenching metal parts. Represented by: J. W. Kelley, president; H. B. Northrup, secretary, and J. E. Burns.

Kelly Reamer Co., Cleveland. Booth 155.
Line of boring and reaming tools, including single point, two point block type, rigid, adjustable core drills and multiple and shell reamers, also, special tools. Represented by: E. W. Putnam, vice-president and general manager, and Haviland Wright.

Charles F. Kenworthy, Inc., Waterbury, Conn. Booth 255.
Metals that have been bright-annealed in the new Kenworthy Kwik-Brite dry and wet type annealing furnaces; reproductions of other Kenworthy industrial furnaces and metal handling equipment. Represented by: Charles F. Kenworthy, president; Howard A. Kenworthy, designing engineer; Ralph E. Worthington, Selden E. Tracy, Irving W. Chapman.

Keystone Lubricating Co., Philadelphia. Booth 296.
Keystone pneumatic safety lubricating system, showing its adaptability for automatic feed intermittently or continuously; special greases for steel mill work, and lubricants for ball and roller bearings. Represented by: H. A. Buzby, president; C. O. Norstrum, H. M. Ludwick, G. W. Hall, T. B. Little, J. R. Lawrence, S. R. Marshall and F. D. Street.

Kinite Corporation, Milwaukee. Booth 179.
Kinite castings, Kinite weld rod, rolled Kinite bar stock, Patterns for Kinite castings, and metal stampings produced on Kinite dies. Represented by: E. J. Mohr, vice-president; William C. Eakin, William J. Graham, T. A. Moormann and L. L. Clark.

L

Lava Crucible Co. of Pittsburgh, Pittsburgh. Booth 19.
Various types of Super refractories in standard brick, standard tile, special shapes, plastics, cements and graphite crucibles. Represented by: H. E. White, R. P. South, F. South, Jr.

E. J. Lavino & Co., Philadelphia. Booths 81 and 82-A.
Chrome, magnesite and silica refractories, Kromepatch, refractory cement and K-N plastic. Represented by: R. E. Griffith, manager refractories engineering and sales; J. W. Corriston, H. A. Morlock, A. DeMacedo, C. B. Reynolds, J. B. Luckie, H. W. Pigott and P. S. Haserodt.

Leeds & Northrup Co., Philadelphia. Booths 214 and 215 and 192 and 193.
Hump hardening and Homo tempering furnaces consisting of latest Hump method hardening furnaces both for tools and for production work, showing advances in method accomplished during the past year; Homo furnaces for both high and low temperature work will also be shown in operation; pyrometer exhibit consists of L & N potentiometer pyrometers including latest models of automatic controllers, recording controllers, indicating controllers and temperature indicators and recorders; feature of the exhibit will be new indicating controller with visible index and scale over entire width of instrument; optical pyrometers and portable indicators will also be displayed. Represented by, Furnace exhibit: G. W. Tall, assistant sales manager; A. E. Tarr, W. A. Lane and W. C. Roxby; Pyrometer exhibit: Henry Brewer, assistant sales manager; E. B. Estabrook, H. N. McMichael, Earl C. Wood and Carl H. Parker.

E. Leitz, Inc., New York. Booths 281 and 282.
The 1929 model of Leitz Micro-Metallograph with a full line of accessories for micro and macro investigations; the Guthrie-Leitz grinding and polishing machine, a labor and time saving device. Represented by: R. Tvestman, O. Soetbeer, W. Schaaf.

Lincoln Electric Co., Cleveland. Booth 132.
Complete electric arc welding equipment together with a display of various castings replaced by welded steel; also a Linc-Weld motor together with a motor operating under water. Represented by: E. E. Lewis, O. P. Lang, J. W. Kenworthy, E. J. Pfister, D. C. Anderson, A. F. Davis.

Linde Air Products Co., New York. Booths 109, 145 and 146.
Products fabricated by the oxy-acetylene welding process. Represented by: R. W. Boggs, T. C. Fetherston, A. G. Wikoff.

M

Mahr Mfg. Co., Minneapolis. Booth 18.
Operating model of gas fired rotary hearth forging furnace. Represented by: W. G. Barstow, sales manager; C. F. Olmstead, assistant sales manager; A. J. Nordenson, Ray G. White, G. A. Ledebur, E. F. Piea, B. G. Harmon, C. W. Rudolph and A. Tenney.

Marburg Brothers, Inc., New York. Booth 238.
Precision die filing and sawing machines; and samples of work done on these machines. Represented by: Theodore H. Marburg, president; Louis C. Marburg, secretary-treasurer; Francis Marburg.

McCann Harrison Corporation, Cleveland. Booth 25.
Models of two new conveyor automatic furnaces. Represented by: H. P. McCann, president; Edward Busch, eastern sales manager, and Charles L. Stewart, western sales manager.

McGill Metal Co., Valparaiso, Ind. Booth 74.
Various types and sizes of ball bearings, together with several machine parts showing actual application of ball bearings; machine for testing ball bearings under service conditions will be in actual operation. Represented by: Frank R. Schubert, vice-president; W. E. Brownell, treasurer; T. L. Robinson, chief engineer, and William Scrimgeour, Washington district manager.

Metal & Thermit Corporation, New York. Booth 89.
Carbidefree alloys and materials and equipment for Thermit welding, showing improved process of welding with samples of completed welds. Represented by: J. H. Deppeler, H. D. Kelley and R. L. Browne.

Michigan Steel Casting Co., Detroit. Booth 27.
Misco high temperature alloy castings, bars and sheets, including carburizing boxes and tubes, cyanide pots, dipping baskets, rotary furnace retort; also furnace parts, such as rails and plates, and several types of pusher furnace trays and fixtures; Misco alloy chain of several types and Misco alloy rolled bars and rolled sheets. Represented by: F. J. Stanley, general manager; E. D. Flintermann, sales manager; J. D. Corfield, W. E. Broadbelt and J. C. Redmond.

Michigan Tool Co. and Colonial Tool Co., Detroit. Booth 240.
Gear hobs, spline hobs, gear shaper cutters, thread generating cutters, milling cutters, end mills, metal slitting saws, side milling cutters, screw machines and turret lathe tools, spline broaches, keyway broaches and serration broaches. Represented by: J. W. Mull, Jr., general sales manager; T. A. Oleik, E. O. Jenkins and C. M. Conner.

Midvale Co., Philadelphia. Booth 222.
Finish machined forgings, rough steel castings, hardened and ground forged steel rolls, automobile body die with tool steel inserts, Diamond brand tool steel tools and dies, extra high-speed steel cutters, stainless steel bars. Represented by: A. C. Dinkey, president; H. L. Frevert, vice-president; Stuart Hazlewood, vice-president; H. E. Rowe, bar steel sales manager; and others.

Milburn Co., Alexander, Baltimore. Booth 127 and Gas. Sec.
Oxy-acetylene equipment, cutting torches, welding torches and regulators. Illuminating gas cutting torches; full line of paint spray equipment; oil burning and preheating equipment and portable carbide lights. Represented by: E. P. Boyer.

Milwaukee Die Casting Co., Milwaukee. Booth 198.
Various types of die castings in aluminum, zinc, lead and tin alloys, and samples which have been polished and plated; also various assemblies to demonstrate application of die castings in connection with the various metal working industries. Represented by: H. F. Schroeder, vice-president, and Charles H. Frantz, sales engineer.

Molybdenum Corporation of America, Pittsburgh. Booth 115.
Molybdenum steels. Represented by: Clifton Taylor, sales manager; William H. Phillips and G. M. Eaton.

Morse Twist Drill & Machine Co., New Bedford, Mass. Booth 212.
Complete line of high-speed and carbon steel drills, reamers, taps, dies and milling cutters; also new forge type high-speed

drill and other special tools. Represented by: F. O. Lincoln, vice-president in charge of sales, and George M. Read.

Mueller Brass Co., Port Huron, Mich. Booth 83.
Brass and copper tubing, brass and bronze nickel-silver rod, brass, bronze and copper nickel-silver forgings, brass, bronze and nickel-silver screw machine parts, and brass and bronze sandcastings. Represented by: W. W. Roach, assistant sales manager, mill products division; B. F. Mueller, assistant sales manager.

N

National Electric Light Association, New York. Booths 182, 218.
A five-reel motion picture film illustrating modern applications of various types of electric furnaces to annealing, carburizing, hardening, vitreous enameling, and steel melting; also an exhibit of various steel parts heat treated in electric furnaces. Represented by: C. E. Russell, C. P. Yoder, D. St. Pierre Du Bose, A. D. Spillman, R. H. Mather.

National Twist Drill & Tool Co., Detroit. Booth 320.
Complete line of twist drills, milling cutters, reamers, hobs, and special tools; what is said to be smallest twist drill in world; new type inserted tooth milling cutter, and new type heavy duty counterbore. Represented by: Harry Butler, assistant sales manager; George Ringstad, E. W. Haines, J. J. Jordan and C. Cornwall.

New Departure Mfg. Co., Bristol, Conn. Booth 190.
Ball bearings.

Norton Co., Worcester, Mass. Booth 51.
Display of alundum and crystolon and refractory ware, such as muffles, hearth plates, crucibles and similar products. Represented by: Harry B. Lindsay, sales manager refractory division.

R. D. Nuttall, Pittsburgh. Booth 135.
Complete new line of reduction gear units and speed reducers. These units all have as features of their design, single helical gears; Timken roller bearings; a rigid, ribbed, three-section case; and a positive splash lubrication system.

O

Tinius Olsen Testing Machine Co., Philadelphia. Booths 269 and 270.
Cloudburst hardness testing machine and equipment for superhardening steel; Johnson hardness tester for applying Brinell hardness test; Haigh alternate stress testing machine; Herbert pendulum hardness tester; Honda sharpness testing machine for testing cutlery, etc.; Olsen universal testing machine for tension, compression and transverse testing; Olsen direct motor driven production type Brinell hardness tester and hand operated type of machine; latest type of direct motor driven ductility testing machine for sheet metal testing; Olsen polishing machine; various extensometers, including the Olsen-Smith stress strain recorder; new Olsen-Lundgren dynamic type balancing machine, operated on centrifugal high tension spark principle, and latest Olsen-Lundgren automatic weighing static balancing machine. Represented by: Thorsten Y. Olsen, vice-president; Robert B. Lewis, Jacob Lundgren and Bruce L. Lewis.

P

Page Steel & Wire Co., Bridgeport, Conn. Booth 103.
Page welding wire, featuring the No. 10 package; a flame test, used for comparing various grades of welding wire; photographs and samples of Page bridge wire which was used in the Philadelphia-Camden Bridge and which is now being used in the Detroit International Bridge and the Mount Hope, R. I., bridge. Represented by: W. T. Kyle, L. S. Lankton.

Peerless Machine Co., Racine, Wis. Booth 278.
High-speed metal sawing machines. Represented by: Charles Rasmussen, president; I. M. Ward, vice-president, and A. H. Goetz, sales manager.

Pittsburg Instrument & Machine Co., Pittsburgh. Booth 284.
Precision Brinell testing machine, power-driven Brinell testing machine, hand-operated Brinell testing machine, Brinell microscopes, depth indicator for Brinell testers, sheet metal tester, metallographic grinder, and proving ring for checking Brinell machines. Represented by: Paul Kammerer.

Porter-Cable Machine Co., Syracuse. Booth 333.
Porter-Cable Hi-speed production lathe; Porter-Cable heavy duty universal milling attachment; Syracuse horizontal disk sander, type D-3; Syracuse two belt sander and grinder, type 2B3; Take-About and Super Take-About hand sanders with bench stands; Porter-Cable portable electric hand saw. Represented by: K. O. Ditmars, D. J. Ridings.

Horace T. Potts & Co., Philadelphia. Booth 166.
Tools and dies made of various grades of tool steel. Represented by: Arthur L. Collins, Henry R. Wimmersberger, Maurice H. Felty, and L. D. Willis, A. W. Ainsworth, Guy P. Bible, Thomas C. Potts, Charles William Potts, J. J. Drexler, Claude Mengel, Stanley L. Bateman, W. H. Dunlap.

Production Machine Co., Greenfield, Mass. Booth 210.
Polishing and puncning machines. Represented by: A. H. Behnke, vice-president.

Pyrometer Instrument Co., New York. Booth 151.
Pyro radiation pyrometers; Pyro optical pyrometers; Pyro immersion pyrometers; Pyro surface pyrometers. Represented by: Richard C. Jordan, F. D. Heidorn, O. Raab.

R

Reeves Pulley Co., Columbus, Ind. Booth 176.
Reeves variable speed transmission, unit for obtaining infinite variable speed control and used extensively in connection with continuous heat treating furnaces; improved design of Reeves transmission, embodying all recent improvements. Represented by: C. L. Irwin, T. A. Bergen and Philip C. Talbot.

Charles Reines, Brooklyn. Booth 17A.

George P. Reintjes Co., Kansas City, Mo. Booth 15A.
Display of Reintjes flat arch brick for use in high temperature furnaces, especially where large cross section of the gas duct is required and where head work is limited; also truss arch shapes. Represented by: George P. Reintjes, S. Skouse, John Hawkins.

Riehle Brothers Testing Machine Co., Philadelphia. Booth 291.
50,000-lb. vertical screw testing machine, universal type with new auto type gear box unit; Vickers diamond hardness tester; proving rings, and pamphlets and photographs. Represented by: F. Buckingham, superintendent; George Lawrie and A. Fuller Riehle.

Stanley P. Rockwell Co., Hartford, Conn. Booth 80.
Model LA (laboratory) Rockwell Dilatometer; Model RA (remote control) Rockwell Dilatometer on model furnace; also Rockwell Dilatometer equipment in booth of E. F. Houghton & Co., and in booth of Peoples Gas Light & Coke Co. Represented by: Stanley P. Rockwell, president and treasurer; Warren D. Fuller, vice-president; Raymond W. Woodward, secretary; William A. Stumpf, Kenneth Stumpf.

W. S. Rockwell Co., New York. Booth 63.
Illustrations, drawings and technical data on industrial furnace equipment, and special types of blast gates for controlling air lines. Represented by: M. L. Hollister, R. M. Atwater, J. A. Doyle, C. D. Barnhart, H. J. N. Voltmann.

John A. Roebling's Sons Co., Trenton, N. J. Booth 91.
Welding wire. Represented by: J. L. Unsworth, A. L. Miller, A. E. Gaynor and E. T. Bertram.

The Roessler & Hasslacher Chemical Co., New York. Booth 262.
Cyanide case hardening mixtures; cyanegg; copper cyanide; cadmium oxide; chromic acid; sodium stannate, and R & H drawing salts. Represented by: W. M. Gager, C. H. Proctor, W. J. Schneider and S. C. Harris.

Rotor Air Tool Co., Cleveland. Booth 22.
Rotor type D-1 grinder, standard; Rotor type D-1 grinder, high production model, using Redmanol, bakelite and rubber bonded wheels, 6 in. size, load speed 5000 r.p.m.; D-3 grinder, standard; D-3 grinder, high production model, a new model, using rubber bonded, bakelite and Redmanol wheels, 8 in. size, load speed 4000 r.p.m.; Rotor sander; E-1 drill; E-2 drill; E-5 drill, 29/32 in.; E-5 drill, 1¼ in. Represented by: H. P. Bailey, president; K. L. Pohlman, vice-president; G. O. Singer, F. R. Moore, L. K. Berry, F. W. Hammer.

S

George Scherr Co., New York. Booths 180 and 181.
Schuchardt & Schütte new size No. 10 quick-change gear hobber, special worm miller, automatic hob grinder, universal relieving lathe, small gear hobber with fully automatic cycle of operation; full line of Carl Zeiss optical measuring instruments, including a new 40 in. optical precision measuring machine. Represented by: George Scherr, president; Fritz König, secretary; George VandePlanck, George Kaner.

Sentry Co., Taunton, Mass. Booth 64.
No. 1 Model H small carbon steel hardening furnace, No. 1 Model HS small high-speed steel hardening furnace, No. 1

Model L 8 x 16 in. pot furnace (first time exhibited). Represented by: A. A. Harvey, sales manager; P. B. Crocker, treasurer.

Shenango-Penn Mold Co., Dover, Ohio. Booth 227.
Centrifugally cast bronze in various diameters and lengths made of standard and special compositions in the rough, semi-finished and finished in the form of solids, tubes, bushings, sleeves and liners; solids and tubes in the rough, bushings, sleeves and liners in the rough, semi-finished and finished. Represented by: H. S. Bradley, president; G. L. Collard, vice-president; F. A. Demms, treasurer; H. M. Wilson, secretary; J. P. Jefferis, manager; H. H. Zollar, P. H. Jefferis, Rafford Pitt, C. R. Hayes.

Shore Instrument & Mfg. Co., Jamaica, N. Y. Booth 236.
Shore's scleroscopes, C-2 pneumatic and D dial types for testing the hardness of metals and materials; durometer and elastometer, improved, for testing rubber and plastic material for density, hardness and elasticity; optical pyrometers, A and B pyroscopes, for heat treating and foundry temperatures; Localcase and Localhard, for localizing, carburizing and hardening of steels; the Monotron hardness indicator, latest addition to company's line of precision testing apparatus. Represented by: F. G. Kendall, sales manager; J. M. Kendall.

Siewek Tool & Die Co., Detroit. Booth 287A.
Small tools and dies.

Simonds Saw & Steel Co., Fitchburg, Mass. Booth 150.
Complete line of circular and band saws for cutting wood or metal; also hack saw blades, files, machine knives and high-speed, carbon and special tool steels; also a new inserted tooth metal cutting saw, developed this year by Simonds engineers, this new saw has a high-speed steel tooth especially shaped for faster cutting with a minimum of power. Represented by: C. R. Pafenbach, steel sales manager; H. B. McDonald, metal saw superintendent.

Sleeper & Hartley, Inc., Worcester, Mass. Booth 231.
No. 2 universal coiler, with latest improvements. Represented by: Patsy Mignacca.

David H. Smith & Sons, Inc., Brooklyn. Booth 285.
Sonntag quadruple punch, angle, bar and plate shear notcher, with rolled steel plate frame construction, in two sizes; special new features are new type die blocks which allow clear use of all throat space, also notcher built-in as an integral part of the machine. Represented by: David H. Smith, chairman of the board; Austin D. Smith, president; Dudley J. Smith, vice-president; W. H. Krapohl, manager machinery dept.

Smith Welding Equipment, Eastern Corporation, Philadelphia. Booth 140.
Welding equipment.

Southern Manganese Steel Co., St. Louis.
Assortment of heat and corrosion-resistant alloys in the chrome, nickel series produced under the trade name of Fahralloy. Represented by: E. F. Mitchell, sales manager; W. M. Black, J. T. Norris, D. M. Powers, F. A. Fahrenwald, A. W. Daniels, general sales manager.

Southwark Foundry & Machine Co., Philadelphia. Booth 217.
One 60,000-lb. testing machine; McCollum-Peters electric telemeter; Whittemore strain gage; and Huggenberger Tensometer. Represented by: H. A. Weaver, general manager, Steel City Testing Laboratory; Francis G. Tatnall, manager, testing equipment division, Southwark Foundry & Machine Co.

Spencer Turbine Co., Hartford, Conn. Booth 16.
Spencer Turbo-compressors for supplying air in connection with oil and gas burning industrial furnaces, foundry cupolas, etc. Represented by: S. E. Phillips, president; F. A. Wright, F. D. Bailey, O. J. Dingee.

Standard Alloy Co., Inc., Cleveland. Booth 19A.
Standard alloy carburizing boxes, lead pots, normalizing and pack heating furnace disks and spacers, enameling burning racks, heat resisting conveyor chain grates, furnace trays and shoes, chimney pots, furnace parts and miscellaneous heat and acid resisting castings covering in general the heat treating and chemical field. Represented by: Frank F. Jackson, vice-president; Harvey M. Smith, sales director; Emerson M. Williams, treasurer; J. H. Williams, secretary; Charles D. Cutting, Herbert A. Cutting.

Standard Tool Co., Cleveland. Booth 199.
Carbon and high-speed twist drills, reamers, milling cutters, taps, chucks. Represented by: W. P. Ross, sales manager; H. H. Polk, D. M. Dorsheimer, Jr., F. T. McGuire, C. C. Buck.

L. S. Starrett Co., Athol, Mass. Booth 248.
Mechanics' tools. Represented by: D. Findlay, sales manager; A. H. Starrett, master mechanic; D. Moffat, H. E. Masters.

Steel Casting Development Bureau, Philadelphia. Booths 316 and 314.
Steel castings of superior physical properties developed by carefully controlled heat treatment; panels illustrative of the normal, annealed and heat treated structures of plain carbon steels and special alloy steels, physical test specimens, photomicrographs. Represented by: George Batty, research director, and representatives of member companies.

Steel City Testing Laboratory, Detroit. Booth 217.
Style A hand Brinell machine; Type O3 power operated Brinell machine, latest model with chain drive; Type P portable hardness testing hammer; SKW adapter for scleroscope; Type R2 sheet metal tester; Southwark-Emery 60,000 lb. capacity universal testing machine; Brinell microscopes. Represented by: H. A. Weaver, general manager.

Sullivan Machinery Co., Chicago. Booth 336.
WG-6 8 x 6 in. gas compressor, belt-driven from electric motor; WL-44 240 cu. ft. 4-cylinder vertical compressor (to furnish air to exhibitors). Represented by: H. C. Sargent, E. F. Pie.

Surface Combustion Co., Toledo, Ohio. Booth A. G. A. section.
Heat treating furnace with two stage burners and automatic temperature control for temperature range of 1200 deg. to 2000 deg. Fahr.; small oven furnace for high-speed steel treating; standard forge furnace; varnish burner; small oven heat treating furnace; circular cyanide hardening furnace; aluminum melting furnace; crucible brass melting furnace. Represented by: F. W. Manker, vice-president; C. B. Phillips, vice-president; C. A. Blesch, W. T. Fulton, Philip Kriegel, F. C. Starr, F. H. Trembley, K. H. Cree, E. A. Weaver.

Swind Machinery Co., Philadelphia. Booth 206.
Machine tools.

T

R. D. Thomas & Co., Philadelphia. Booths 100 and 102.
Westinghouse arc welders, T-grid furnaces, Gibb press and seam welders, Gibb spot welders, Hevi-Duty electric furnaces, Wanamaker arc welding electrodes. Represented by: R. D. Thomas, president, A. M. Taylor, C. M. Rusk.

Thwing Instrument Co., Philadelphia. Booth 276.
Thwing model 28 recorder, exhibited for the first time; Thwing radiation pyrometers (latest developments in this type of pyrometer including the new tube for permanent mounting); Thwing A5X pyrometer for non-ferrous metal temperatures; Thwing inspector's calibrating and checking set; Thwing electrical resistance thermometers. Represented by: C. B. Thwing, president; E. J. Albert, secretary and general manager; P. P. Bourquin, superintendent; A. S. Hall LeRoy Driscoll.

Timken Steel & Tube Co., Canton, Ohio. Booths 232 and 234.
Reception space. Represented by: A. J. Sanford, W. H. Wiewel, Robert Atkinson.

Torchweld Equipment Co., Chicago. Booth 176.
Gas welding and cutting equipment, improved cutting torches, Torchweld safety pressure regulators, acetylene generators, welding accessories and supplies. Represented by: W. A. Slack, president; R. M. Smith, assistant sales manager; M. N. Pike, L. R. McKean.

Transportation Engineering Corporation, Brooklyn. Booth 100.
Full line of Wanamaker coated electrodes and Rex electrodes, together with arc welding accessories. The Wanamaker coated and Rex electrodes are made in various diameters adapted for various classes of welding and in varying analyses to conform as closely as possible to the parent metal to be welded. Represented by: F. V. McGinness, president; H. W. Stortz, vice-president.

Harold E. Trent Co., Philadelphia. Booth 71.
Electric pot and trough type heat treating furnaces for lead, salt or cyanide; direct heat electric furnaces for steel treating; melting pots for babbitt, solder, tin, etc.; and other Trent industrial equipment. Represented by: H. E. Trent, president; J. V. Calhoun, sales manager; C. M. Adams, J. R. Eves, and others.

Tuthill Pump Co., Chicago. Booth 277.
Full line of high grade rotary pumps, from ½ g.p.m. to 200 g.p.m. for use in heat treating departments or for general plant use in handling of oils for all uses, supplying coolant on machine tools, and thousands of plant uses. Represented by: O. L. Bock, H. C. Osborne.

U

Una Welding & Bonding Co., Cleveland. Booth 138.
Represented by: E. R. Alexander, president; E. W. Kronbach, general manager; A. A. Probeck, vice-president; L. S. Burgett, chief engineer; J. B. Austin, research engineer.

Union Mfg. Co., New Britain, Conn. Booth 239.
Lathe chucks; Union-Red roller bearing hoist, a new line. Represented by: H. H. Wheeler, treasurer; E. I. Stevens, G. V. Murphy.

Universal Steel Co., Bridgeville, Pa. and Cyclops Steel Co., Titusville, Pa. Booth 164.
Sheets of carbon and alloy steels, showing hack saw, gin saw, hand saw, circular saw, cutlery, magnet, high-speed, agricultural disk and soft center steels; bars of carbon, alloy and high speed tool steels, ball race, magnet, file and valve steels; sheets and bars of heat resisting and non-corrosive steel and alloys; cold-drawn bars and cold-rolled sheets; finished products from the foregoing; new die steel for hot forming and heading. Represented by, Universal Steel Co: J. O. Rinek, assistant general manager; U. G. Miller, general superintendent; Frank Garratt, sales metallurgist; H. M. German, metallurgist; H. Copp, Jr.; Cyclops Steel Co.: Charles Evans, vice-president and general manager; F. F. Harter, F. H. Cooke.

Unishear Co., New York. Booth 207.
Mighty Midget Unishear, Model A-14 Unishear, Model O-54 Unishear, Model A-10 Unishear. Represented by: H. J. Heller, vice-president; George B. Shiras, sales manager; H. H. Gildner.

V

Vanadium-Alloys Steel Co., Latrobe, Pa. Booths 156 and 157.
High speed, alloy and tool steels; fractures of same showing the effects of different heat treatments; tools showing typical applications of these steels; cold-drawn, high-speed, alloy and carbon tool steels with products of same. Represented by: Roy C. McKenna, president; Floyd Rose, vice-president; L. D. Bowman, works manager; J. P. Gill, metallurgist; R. B. George, M. W. Caruthers, W. R. Mau, F. W. Potts, D. L. Bardes.

Vanadium Corporation of America, New York. Booth 257.
Ferro vanadium, silico vanadium, alumino vanadium, vanadium metal (95 per cent), ferrochrome, ferro silicon, Alsifer; vanadium steel railroad springs, valve springs, carbon vanadium automobile crankshafts, forgings, etc. Represented by: Ward A. Miller, vice-president; B. D. Saklatwalla, vice-president, J. A. Miller, Jr., general manager of sales; G. A. Laub, assistant general manager of sales; H. T. Chandler, assistant to president; N. Petinot, assistant to president; G. L. Norris, chief metallurgical engineer; Jerome Strauss, chief research engineer; C. N. Dawe, C. B. Woodworth.

Van Dorn Electric Tool Co., Cleveland. Booth 292.
Standard line of universal tools, such as drills, grinders, electric screw drivers, electric wrenches and electric hammers, as well as reamers. Represented by: F. H. Zulauf, vice-president and general manager; Lyman H. Bellows, general sales manager; Louis Charnicky, S. S. Waters.

Vulcan Crucible Steel Co., Aliquippa, Pa. Booth 224.
High-speed, alloy and carbon tool steels and special steels. Represented by: S. G. Stafford, president, R. M. Kelso, A. D. Beeken, Jr., S. A. Stafford, W. H. Norris, Norman C. Einwechter, C. E. Conway, W. F. Kline.

W

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Booths 133, 135 and 137.
Complete line of portable electric welders, one in operation; sectionalized pot-type electric furnace; double Nuttall gear unit; Nuttall mill unit, and other displays of Nuttall gears. Represented by: T. C. Kelley, W. W. Reddie, A. M. Candy, A. P. Lesnick, William Norberg, G. H. Koch, Mark Dawson and P. H. Grunnagle.

Wheeling Mold & Foundry Co., Wheeling, W. Va. Booth 299.
Section of chilled iron sheet mill roll, section of alloy steel heat treated roll; section of Wheeling metal roll, alloy steel heat treated forging die, and alloy steel hammer ram. Represented by: H. E. Field, president; E. A. Balsley, vice-president; R. C. Heaslett, Craig Adair.

Wheelock, Lovejoy & Co., Inc., Cambridge, Mass. Booth 147.
Hy-ten alloy machinery steels; Whelco tool steels in application to special parts, and replica of open-hearth furnace in operation. Represented by: A. Oram Fulton, president; F. H. Lovejoy, vice-president; E. C. Bartlett, S. W. Parker, C. R. Jenks, A. L. Knight, A. F. Erikson, H. B. Briggs, H. M. Foster, G. S. Longley and T. W. Knight.

Whitney Metal Tool Co., Rockford, Ill. Booth 273.
New 18 in. and 24 in. throat depth ball bearing punches. Represented by: Gus Jensen and John Jensen.

Wiedemann Machine Co., Philadelphia. Booth 236-A.
Photographs of plant and various parts. Represented by: Theodore Wiedemann, president; Henry Bockrath, vice-president; Joseph H. Bockrath, secretary, and Otto F. Wiedemann.

Edwin L. Wiegand Co., Pittsburgh. Booth 71.
Complete line of Chromalox products, such as strip heaters, space heaters, immersion units, complete electric heaters, automatic electric water heaters, etc. Represented by: Ernest N. Calhoun, sales manager; C. M. Adams, H. E. Trent, J. V. Calhoun.

J. H. Williams & Co., Buffalo. Booth 226.
Drop-forgings, for automobiles, airplanes, etc.; drop-forged wrenches from chromium-molybdenum and plain carbon steel; monkey wrenches, bull dog wrenches, drop forged clamps, crank handles, eye bolts and hoist hooks. Represented by: J. C. Scanlon, general sales manager, special forgings; Philip Rigby, Walter Linde.

Wilson-Maeulen Co., Inc., New York. Booth 78.
Rockwell hardness testers, indicating pyrometers, recording pyrometers and automatic temperature controllers. Represented by: G. B. Duff and William Printz.

Wilson Welder & Metals Co., Hoboken, N. J. Booth 95.
Model S 200-amp. welding machines, one driven by electric motor, and other by gas engine, in operation; also Wilson Color-tipt welding wire and other accessories. Represented by: T. B. Hasler, president; E. D. Bransome, vice-president; Alexander Churchward, technical manager; J. A. Quarmby, sales manager; Harry Schemm, demonstrator, and representatives from Joseph T. Ryerson & Son, Inc., and Peter A. Frasse & Co., Inc., distributers.

Y

Young Brothers Co., Detroit. Booth 233.
Electric laboratory ovens; working models of continuous conveyor ovens; photographic display; and descriptive literature of various types of ovens. Represented by: George A. Young, president; R. B. Reed, sales manager.

Z

Ziv Steel & Wire Co., Chicago. Booth 225.
Various tools and dies made from company's tool steels, and Darwin & Milner, Inc. tools and dies made from Neor and Cobaltcrom PRK-33 steels. Represented by: N. J. Hyslip, vice-president; A. F. Brunck, general sales manager; V. F. J. Tlach, president, Darwin & Milner, Inc.; John R. MacCracken and H. L. Harrison of Darwin & Milner, Inc.

British Methods of Forging Large Seamless Drums

METHODS used by John Broun & Co., Sheffield, England, to manufacture forged drums for extra heavy pressures were described in a recent paper by H. E. Yarrow before the British Association for the Advancement of Science. Mr. Yarrow recommended the use of circular drum-ends or headers, which might be riveted on if the pressure was to be less than 600 lb. per sq. in., but should be closed in without seams for higher pressures.

To secure sound material in the actual forging, sufficient material is removed from the top of the ingot. When cold, the ingots are cut to length and a hole of considerable diameter is trepanned through them.

In the forging process the ingot is both expanded and drawn, and thus is worked both circumferentially and longitudinally. The closed-in end drums are bored after the completion of the forging process, and when cut to length are closed in, particular care being taken to insure that the deformation of the material takes place gradually. The forgings are then heat treated so that the physical properties of the boiler ends are similar to the rest of the forging.

Precision Heat Treatment for Gears

Six-Zone Annealing, Controlled to 7 Deg., Necessary for Maximum Machinability—Oil for Quenching Presses Held to 3 Deg., Plus or Minus

As outlined in former articles, the heat treating equipment installed at the plant of Dodge Brothers, Inc., Detroit, is placed in two plants, No. 1 for treating machined parts, and No. 2 for treating rough forgings. Units are installed for several general classes of operations: (a) normalizing, quenching and drawing of forgings[1]; (b) carburizing,[2] quenching and drawing; (c) cyanide hardening and drawing; (d) heating in electric furnaces, quenching and drawing; (e) lead hardening. Sometimes combinations of these, such as electric furnace heating and cyaniding, are met.

The present article will describe operations on transmission and ring gears. The former are upset from bars analyzing 0.48 to 0.53 per cent carbon, 0.80 to 1.00 chromium, and 0.15 vanadium. The heat number is stamped on each gear, and its identity is preserved through to the finished product.

[1] See THE IRON AGE, Aug. 16, page 389.
[2] See THE IRON AGE, Aug. 30, page 513.

Exact Annealing Gives Maximum Machinability

Dodge transmission gears are annealed in a double tunnel furnace of the pusher type heated by electricity and built by the Electric Furnace Co. The chambers are 46 ft. long, 40 in. wide and are separated by a 12-in. fire wall. The capacity is 1250 lb. per hr. per chamber. The work moves through the chambers in opposite directions, so that the charging end of one tunnel is the discharge end of the other. This permits hot trays to be reloaded and recharged without the necessity of trucking them back to the opposite end.

Operation is automatic and intermittent. A pusher moves the tray into the furnace at a predetermined time interval (approximately 12 min.) and simultaneously dis-

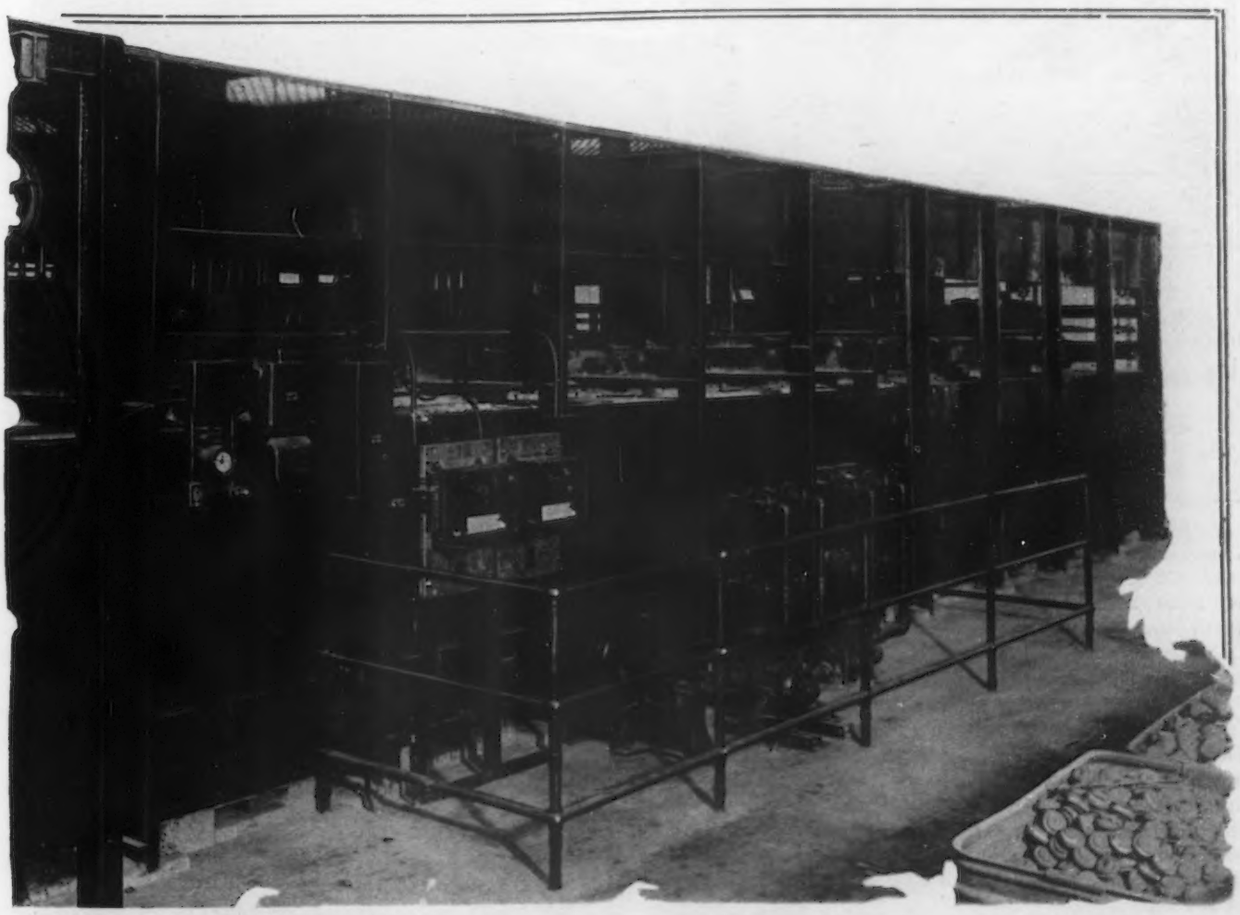


Fig. 1.—Side View of Furnace Annealing Transmission Gears. Work pushed through in trays. Equipment at side includes automatic temperature control, and automatic control of circulating air for cooling zone

charges a tray at the far end. Trays are of alloy steel, 12 x 36 in. in dimensions and are carried on three alloy roller rails. The load is approximately 200 lb. per tray.

The furnace is divided into six zones. First there is a heating zone, then a holding zone and after that a cooling zone, which is followed by three holding zones. Work in the cooling zone is cooled by forced air delivered by a blower through four pairs of cooling ducts made of chrome iron sheets that are located over and under the trays. Thus no air is blown into the furnace hearth. The ducts carry it across and heat is absorbed through the walls of the duct. Each duct has a hand control valve. A common manifold is run from the fan to the first four ducts and a second manifold to the second four ducts. The air supply of each of these manifolds is automatically controlled from a thermocouple inserted between the first and second ducts in the furnace over the trays, as indicated in one of the accompanying illustrations.

Power and time temperature cycles on this annealing furnace are: Heating zone, 150 kw., 2 hr. to 1600 deg. Fahr.; holding zone, 70 kw., 2 hr. at 1600 deg. Fahr.; cooling zone, no power, 1 hr. 15 min. cooling to 1330 deg.; first holding zone; 1½ hr. at 1330 deg., 10 kw., top and bottom elements; and second and third holding zones 2 hr. 50 min., 15 kw., top and bottom elements. Work enters these holding zones at 1320 to 1330 deg. and is discharged at 950 deg.

Work therefore remains in the furnace 9 hr. 35 min. There is a separate thermocouple for each zone and the temperature is electrically controlled by Leeds & Northrup recorders. Temperature is held within a range of 7½ deg., plus or minus.

It is necessary in this furnace to produce and control the above cycle to obtain the desired microstructure, which is coarse lamellar pearlite with some massive ferrite without any sorbite or spheroidal cementite. Experience in the department has shown that this structure gives smoother finished gears from the gear shapers. All annealed blanks are held within limits of 187 to 207 Brinell.

After the transmission gears are annealed in the above described manner for best machinability, they go through the various machine operations and are then ready for hardening.

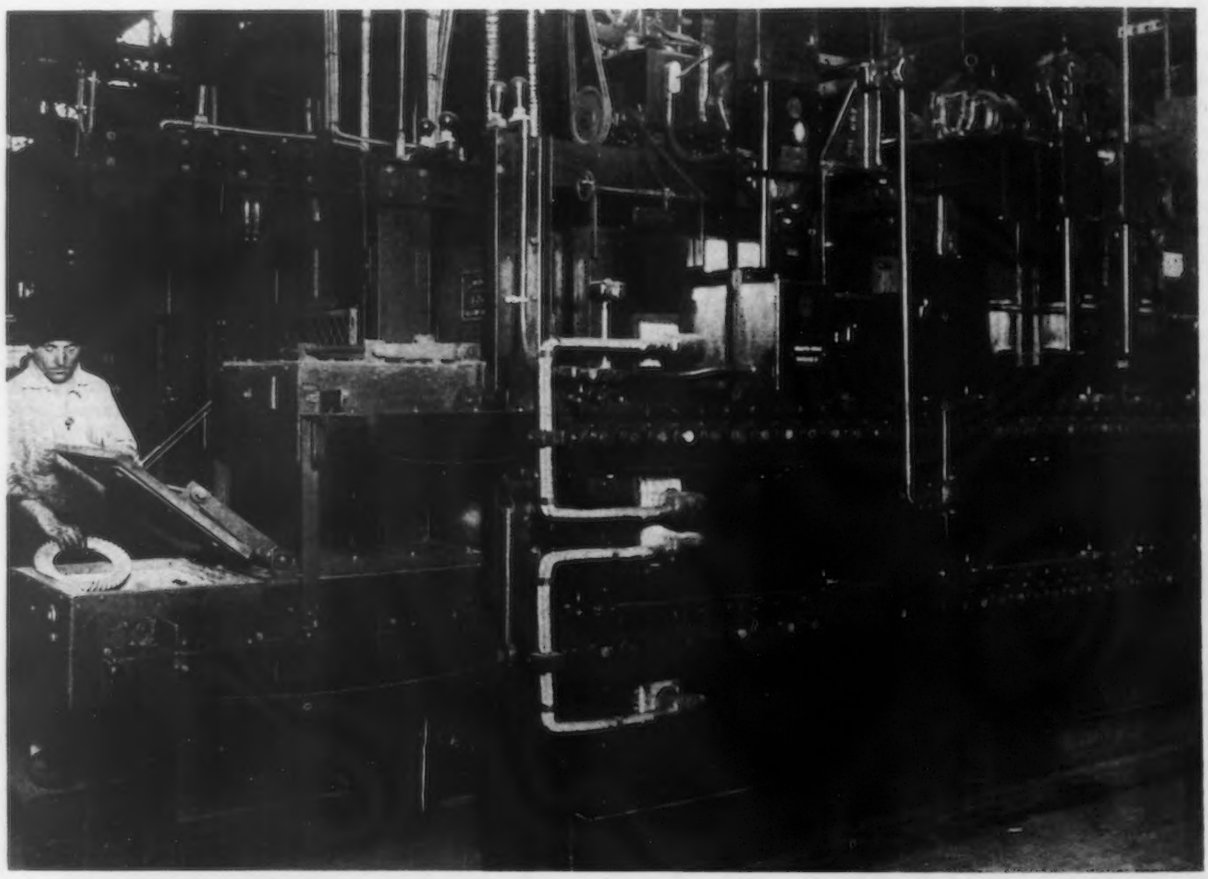


Fig. 2.—Double-Hearth Hardening Furnace for Ring Gears. Hearth bottoms are rollers, ratchet-driven through bars, cranks, and rod to eccentric on top of furnace

Transmission Gears Hardened from Cyanide Pot

All Dodge transmission gears are hardened by a so-called duplex method, a combination of both electric furnace and cyanide treatment. Equipment for this work includes six 105-kw. rotary furnaces and six electrically heated 30-kw. cyanide pots. Four of these pairs were supplied by the American Metallurgical Corporation and two by the Electric Furnace Co. An oil quenching tank of the conveyor type is provided between each pair of furnaces and the cyanide pot is located near the discharge door of each furnace.

The rotary hearth furnaces are 10 ft. 7½ in. in diameter, the hearth is 18 in. wide and the hearth area 27 sq. ft. On it are 20 stations, 18 of which are active. Each carries

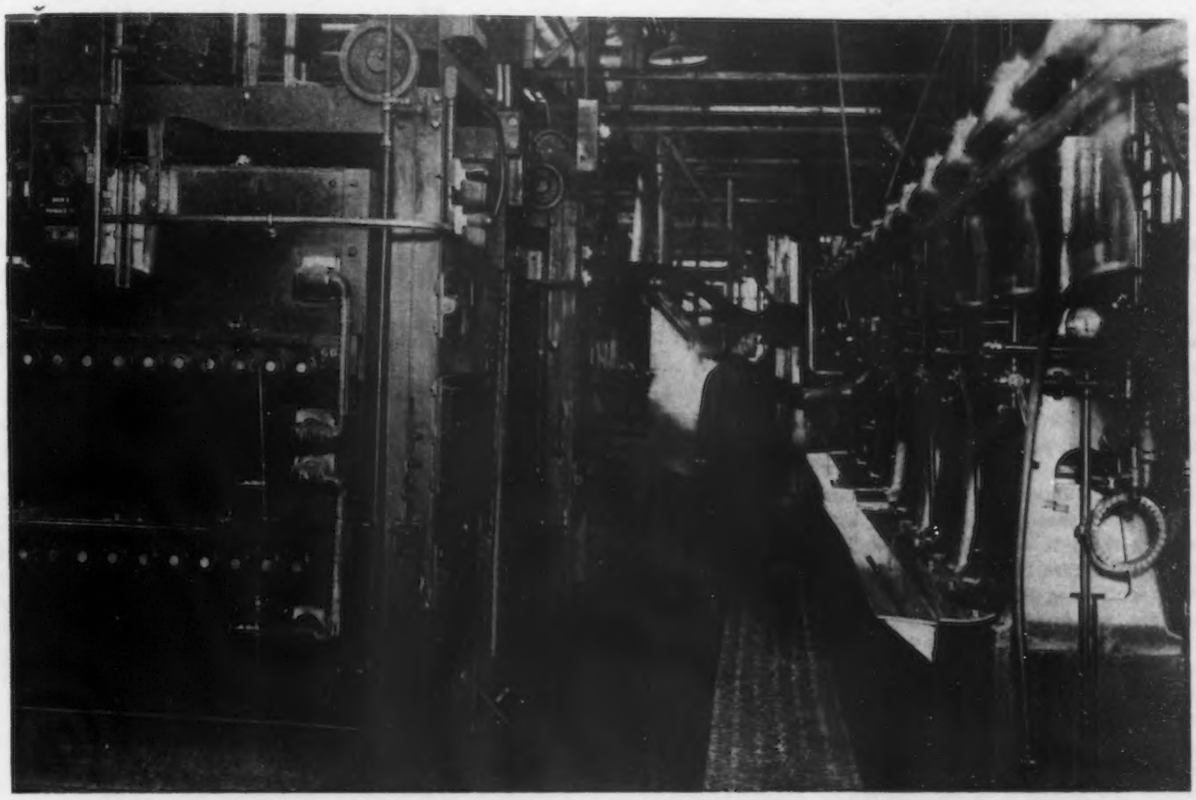
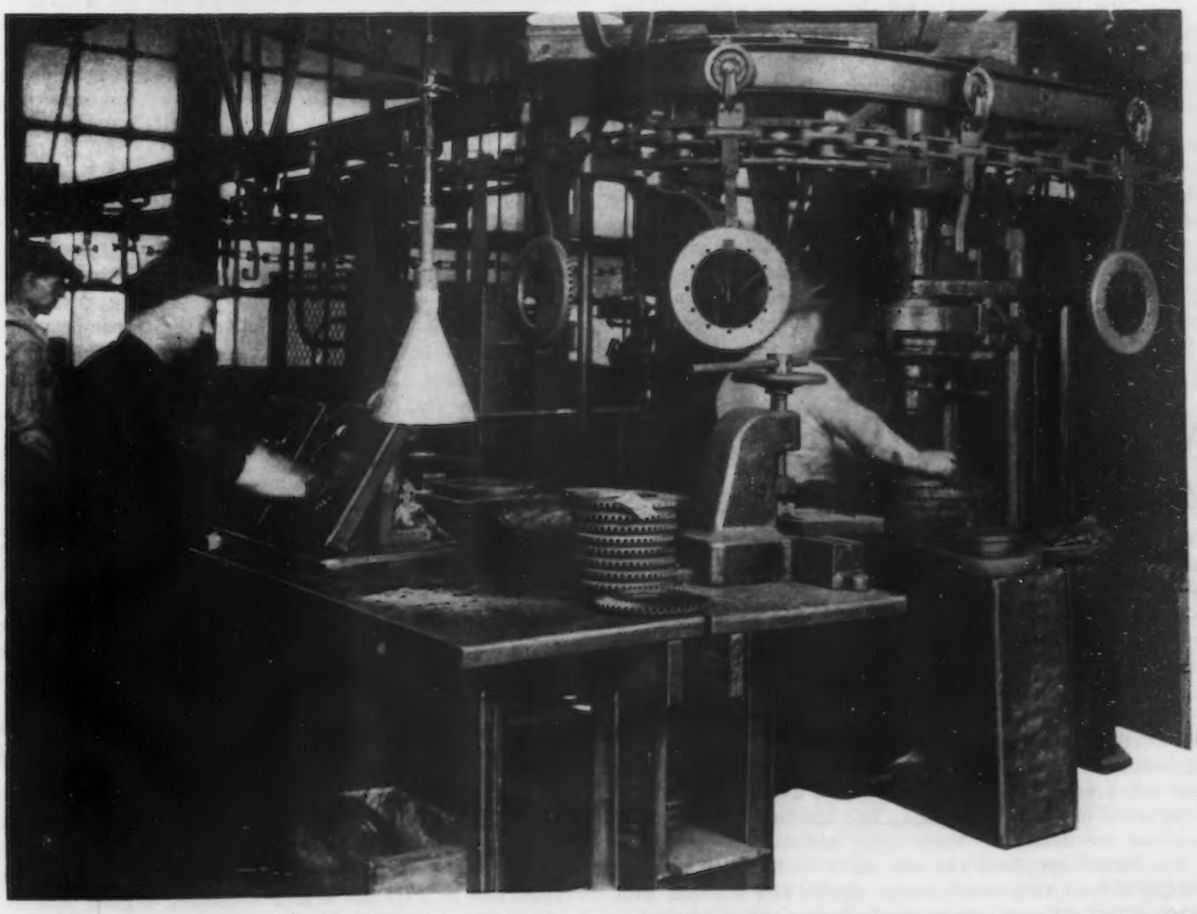


Fig. 3—(Above) Discharge End of Ring Gear Furnace. Battery of six quenching presses at right
Fig. 4.—(Below) Inspection of Finished Ring Gears for Flatness, Roundness and Hardness



two fixtures of gears, each fixture holding three or four flat gears, or two clutch gears. Production varies from 450 to 750 lb. per hour.

Gears are kept in the furnace from 48 to 54 min. At the predetermined time cycle, i.e., 2½ min., the hearth moves forward one station, a motor operated door opens automatically, the furnace tender removes the hot fixtures, places them in the cyanide pot and closes the furnace door. Gears are left in the pot exactly one minute and then removed to the old quenching tank. Time for holding the work in the cyanide pot is indicated by a signal light that burns one minute.

The furnace temperature is 1485 deg. Fahr. and that of the cyanide pot 1490 deg. The latter serves the dual purpose of cleaning off any scale and imparting a slight skin hardness. Oil in the quenching system is circulated through Griscom-Russell coolers and is maintained at a temperature of 90 to 110 deg. Fahr. At the front end of each tank is a propeller to promote a better circulation around the hot gears.

From the quenching tank the gears are suspended from a conveyor that passes through a washing machine and returns them to electrically heated drawing tanks. There are two of these tanks, each 5 ft. 10 in. wide and 19 ft. 6 in. long, containing 1000 gal. of oil. The gears, carried in wire baskets, are kept in these tanks for 45 min. at 400 deg. Fahr., after which they are hung on another overhead conveyor that carries them through a washing machine built by the Detroit Sheet Metal Works. They are then taken from the baskets and given a light wire brushing, and inspected for hardness. Gears are held to scleroscope limits of 72 to 76. It is stated that more than 1250 gears will pass before one rejection is encountered.

Each oil drawing tank is heated by twelve 5-kw. Westinghouse units ranged along the sides of the tank. Baffles are located in front of each heater and a propeller in the end of the tank forces the oil through the center of the tank along the conveyor and back inside the baffles past the heaters.

Ring Gears Oil Quenched in Press

Rear axle ring gears for Dodge motor cars, after forging, are annealed at 1700 deg. for 3 hr. in continuous electric furnaces (described on page 390, issue of Aug. 16), one hour of which is at heat, and then cooled in boxes. The next operation is machining, after which they are carburized in a counterflow furnace and box cooled, as shown on page 513, issue of Aug. 30. This produces a case depth of 0.035 in. to 0.040 in. They are then hardened in a roller type hearth furnace (Fig. 2) with a temperature range of 1430 deg. to 1440 deg. in the heating zone, being kept in the furnace 42 min., quenched in oil in a Gleason press, and drawn 40 min. at a temperature of 300 deg. Gears are then cleaned in a washing machine built by the G. & M. Industrial Equipment Co., Detroit. Hardness inspection follows and then an inspection for flatness and roundness. (Fig. 4.) Straightening is done if necessary. File and scleroscope tests on the finished gear must approach a file hardness and within a scleroscope hardness of 80 to 90.

Two roller hearth furnaces built by the Electric Furnace Co. are used for hardening the ring gears. Each has two tunnels, one above the other. The gears are propelled through the furnace by 30 rollers that form the hearth and are driven outside the furnace walls by ratchet and an eccentric through a speed reducer from the motor located on top of the furnace. This drive is shown at the right center of Fig. 2.

These furnaces are 9 ft. 2 in. long and 24 in. wide and are arranged to bring the gear up to heat in 30 min. and to soak for 12 min. In the first zone of each chamber 23 kw. of energy is required, and 12 kw. in the second zone. Each tunnel delivers 28 gears an hour. A signal flashes 15 sec. before the gear reaches a stop at the discharge end. The loading end shown in Fig. 2 is arranged with trap doors and guides so that the gears must maintain a staggered position one inch apart. Six Gleason quenching presses (Fig. 3) with dies of improved design are located in front of the furnaces. Oil is delivered to the gears in the press at the instant of quenching at 30 lb. pressure through 2-in. lines.

Oil Circulating Systems

Oil for quenching ring gears is carried in a 1000-gal. underground storage tank and is pumped by a centrifugal pump driven by a 50-hp. motor at 40 lb. pressure at the pump and 30 lb. pressure at the quenching machine. It passes through a Griscom-Russell tubular cooler that holds the pressure constant. Water for cooling the oil is taken from a cooling tower. The oil temperature is controlled automatically by Tagliabue air-operated controllers and diaphragm motor valves. These valves are opened and closed by air pressure. Air is admitted or allowed to escape by a Griscom-Russell controller.

Oil for quenching the transmission gears is stored in a 5000-gal. tank, and is pumped and controlled by a similar unit. The control of the oil temperature is very close at the Dodge plant, being within 3 deg., plus or minus, in the ring gear unit and 10 deg., plus or minus, in the transmission gear unit. The capacity of the ring gear unit is 700 gal. of oil per min., and that of the transmission gear unit 600 gal. per min.

Metal Fuselage Becoming More Popular in European Aircraft

A BRIEF comment on the annual exhibition of aircraft held in the Grand Palais, Paris, was printed in *Engineer* for July 20. From this it is gathered that many countries sent planes, and while there is a noticeable trend toward uniformity in the main details of design, it is obvious that each country is developing a type primarily adapted for its needs. For instance, civil aviation in England and Italy desires overseas communication; Germany represents the other extreme in covering its own territory.

"Bristol" machines particularly show sound mechanical construction, in pleasing contrast with the artifice of punching holes and stressing with wires in order to secure lightness which many machines at one time displayed. All the Continental machines which may be regarded as illustrating progress are noted for their clean appearance, and most of the French airplanes are now made with stiffer sections instead of with very small angles riveted and stressed with wires. The old and rather flimsy construction has practically disappeared. It was noticeable that the majority of machines shown were built almost wholly of metal.

Another feature is the increasing use of reduction gears between the engine and propeller. At one time it was feared that such mechanism would prove unreliable, but the type of gear usually employed has stood up to the work, and is now used on a number of the most prominent machines. There is, consequently, a tendency to adhere to the two-bladed propeller, and this also is often metallic.

The rotary engine has practically disappeared, and the question whether the straight engine or the radial type engine is to be preferred, seems to be answered in favor of the latter. There do not appear to be many cases of straight engines being substituted for the radial type air-cooled engines, and the latter were more strongly represented at the show that formerly, but the Germans use both types, and in Italy the V and W-shaped engines appear to retain their popularity.

Numerous Uses for Bessemer Steel

Cannot Be Duplicated by Open-Hearth Grades for Screw Stock—Makes Excellent Pipe, Bolts and Implement Bars

BY JOSEPH R. MILLER*

IN these later years Bessemer (that is, acid Bessemer) steel has been passing—for in one after another of the purposes for which it formerly was used it has been replaced by open-hearth steel, and in one use after another it has failed in workability and service.

There are three reasons for this situation. First, open-hearth steel with its control of the phosphorus content is available in increasing quantities, and this, of course, is the greatest of the three reasons. Second, service requirements have grown more and more severe; there are more cold operations and there is greater severity in fabricating methods. Third, Bessemer ores of low phosphorus content are becoming scarcer and the ores now available yield a product somewhat higher in phosphorus than was the case in the old days, when Bessemer steel had a pretty good quality reputation.

Open-hearth steel properly made can be a very good quality material. With the control over phosphorus and the more leisurely method of oxidation, and an opportunity to do more or less complete deoxidizing and refining before tapping, open-hearth has a distinct advantage over Bessemer steel from the standpoint of quality and adaptability. With this better material available, the demands of the steel user and fabricator became more severe. And as men could get steel that would stand it, uses and operations came into vogue that were too severe for Bessemer steel. In this way many people have grown to think it inferior and, like anything else that is peculiar, there are certain things for which it should never be used.

Old-Time Bessemer Steel Was Better

When Bessemer steel was used without much limitation for structural sections and rails it was undoubtedly a better product than now, in other ways beside that of lower phosphorus content. Old Bessemer men maintain that the earlier blast furnace practice produced a better iron for Bessemer operations. It is also likely that the older Bessemer men were more skillful, in the art of blowing, in bringing out the proper quality in the blown metal, aided perhaps by peculiar qualities of virtue in the iron, as they say. Be this as it may, the present problem in the use of this product must take account of it as it is, for any trend for betterment cannot be expected.

In spite of these considerations, there are certain purposes for which Bessemer steel is better fitted than open-hearth steel, and there are many uses to which the two are equally adaptable; and it is in these uses and for the convenience of the duplex process that the Bessemer plant survives.

The qualities which give Bessemer steel value for certain definite uses or combinations of uses are three:

a. Machineability.
b. Weldability.
c. Stiffness.

These qualities are greater in Bessemer steel and they can be combined in unusual ways so as to produce desirable results. For instance, we can make a weldable steel that is easily machineable, while any weldable steel made in the open-hearth furnace will not be particularly easy to machine, and especially to thread. This makes the Bessemer very good as pipe steel and especially for the internal threads of pipe couplings. This also makes it successful for bolts and rods which are to be threaded and welded. This material, also, will be stiffer and stronger than either iron or weldable open-hearth steel. The combination of weldability and stiffness and superior machineability gives the soft grades of Bessemer steel a place of preference for the agricultural implement trade and similar uses.

With added sulphur, and sufficient manganese content to carry it, different gradations of a free-cutting material are produced: steel for cut thread bolts and nuts, steel for wood screws with more moderate manganese content, and the magnificent Bessemer screw steel, which cannot be duplicated for its purpose by any other steel mixture.

Interchanging in the Higher Carbons

In the higher carbon grades Bessemer steel is made for many special uses, and particularly for the agricultural implement trade, which in the main sticks to its old habits. These grades have the advantage of being a little stiffer in Bessemer. The mills have with permission substituted open-hearth of equivalent stiffness in higher carbons on many occasions, so that an interchangeability has been mostly established. In substituting basic open-hearth steel, in a general way the carbon content must be 0.15 per cent higher than that of Bessemer, but allowances are made for manganese and silicon, as the 15 points of carbon are allowed for the natural inherent difference from the Bessemer.

In structural shapes Bessemer steel is used successfully up to certain thicknesses and sizes. One will follow very closely these rules:

I-Beams—10 in. and smaller, but seldom above 6 in. Channels—10 in. and smaller, but seldom above 8 in. Angles—6 x 6 x 7/16 in. and lighter, but seldom put in 6 x 6-in. angles; the usual limit applied is 6 x 4 x 7/16 in. Tees—All sections 7/16 in. thick and less.

Trouble with Bessemer shapes is experienced at times in cold punching, shearing, curving to a radius, etc. They are especially susceptible to damage in straightening, and for this reason occasionally one fractures when suddenly overstrained, as by a fall or quick jerk in lifting. This is often a cause for undue alarm about their safety in use; with ordinary care in fabrication, however, they are safe for any standard specifications that allow them.

Bessemer steel which runs above the normal manganese content is apt to be brittle. This is somewhat more marked in the grades carrying sulphur, so that the regular Bessemer screw steel is a somewhat brittle mixture, and should not be used for any structural purpose. The bolt steel, however, carries a normal manganese and is not brittle. For the most part these grades are ruled out of structural use by sulphur specification limits.

Fills Out the Section More Closely

In the rolling mills Bessemer steel has a tendency to resist and fills the grooves, and so, on certain sections with deep flanges or sharp corners, it makes a superior dimension. In cold drawing it comes from the die larger and

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more uniform in size than open-hearth, and it tends to have a brighter surface. Sometimes these features favor the use of Bessemer.

Attempts have been made to simulate Bessemer qualities by making additions of phosphorus to open-hearth melts. The result is not the same. The phosphorus content is not different and some stiffness is added, with the bad fault of cold shortness to some degree. But it does not to any degree help machineability, and when so added phosphorus destroys welding quality. These experiments make the causes for the easy machining and the good welding qualities of Bessemer steel very obscure.

Knowledge of Facts Will Help Users

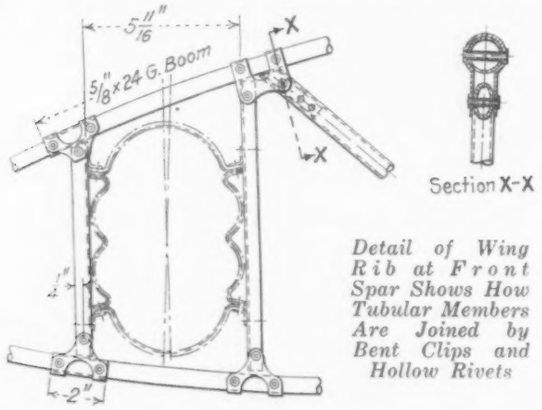
There are these special peculiarities which make it necessary to use precautions in applying and in working Bessemer steel. Were these facts well known to users of steel a permanent confidence would be established behind its use. The main points in which the Bessemer grade is inferior depend upon a tendency toward brittleness under shock or under the effects of cold working, such as bending, punching and shearing. This is accentuated in the grades that carry manganese in amounts above normal—say, above 0.50 per cent roughly, or in segregated portions where the phosphorus tests high—say, much above 1 per cent. Besides this cold shortness, certain Bessemer grades show a more or less marked critical temperature in forging, especially when hot bending is involved—a sort of hot shortness without the expected sulphur as a cause.

If a few of these things are remembered, the use of Bessemer can be regulated properly and its application extended in the right channels, and proper care taken in its fabrication so that it is safe to perform the service for which it was specified.

British Flying Boats Made Entirely of Duralumin

Protection Given Against Corrosion by Anodic Oxidation Process—Light Alloy Found Superior to High-Strength Steel or Wood

ALL-METAL flying boats constructed by Short Brothers, Ltd., Rochester, England, are described in great detail in *Engineering* for Aug. 17. A 20,000-mile flight was taken a year ago in one of these boats by Sir Alan Cobham, powered by two Rolls-Royce "Condor" engines. The above



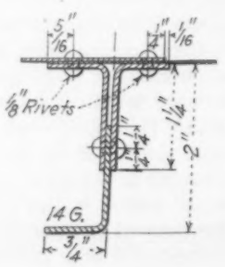
Detail of Wing Rib at Front Spar Shows How Tubular Members Are Joined by Bent Clips and Hollow Rivets

noted article describes a pair of machines constructed during the spring, which have three Bristol "Jupiter" geared engines, each developing 525 hp. at 2200 r.p.m. These are bi-planes of 93 ft. span, weighing 12,404 lb. empty. Each can carry 7596 lb. of load, which includes 15 passengers, pilot, navigator, steward, luggage, instruments, and gas and oil for a 500-mile flight.

Duralumin, protected against corrosion by the anodic oxidation process, is used for the bracing and the covering of hull, wing floats, and engine nacelles. (The latter are mounted midway between planes.) This light strong alloy forms the main spars, ribs and skeleton bracing of wings, rudder and ailerons. These parts are covered with doped fabric except for walkways of duralumin plate on the lower wing for platforms under the engines and walkways on the wing floats. The builders consider that duralumin is as light in weight as high-tensile steel for skeleton frames, is easier to work, and is also less liable to local injury on account of the greater thickness necessarily employed.

Details of the wing construction are shown in an accompanying illustration. The front spar shown dotted is uniform in shape from end to end, and consists of semicircular troughs top and bottom and corrugated sides. These are connected at the lapping flanges by 5/32-in. rivets. The plates are formed in a hand-operated screw press using metal-faced hardwood dies, and afterward finished by rolling. The number of plates used (all of No. 18 gage) depends upon the bending moment to be resisted. Joints between the duralumin tubing forming chords and diagonal bracing of the ribs are made by clips pressed from stainless steel sheet and ⅛-in. hollow rivets.

The hull and the engine nacelles are made of a number of cross frames to which is riveted the outer skin of duralumin sheet, varying from 14 gage to 22 gage. The interior of the hull and nacelles is entirely clear, except for



All Main Frames of Hull Are Made of Double Angles, to Which Outer Surface Is Riveted, and Flanged Plate to Give Lateral Rigidity

the depth of these frames. The latter are of varying construction, depending upon the load requirements; a sketch herewith may be taken as typical of the stronger ones in the hull. Between frames the outer skin is riveted to stiffeners of Vee cross section, the ends of the legs being flanged out for rivets on 2-in. centers. No water-tight packing material is used between the joints in the outer skin, water tightness being secured with a metal-to-metal joint by close riveting below the water line.

Duralumin has these advantages over wood for the construction of that portion of the flying boat which is submerged when in port: Its strength is known with much greater certainty. The weight is less for a structure of equal strength. Water soakage, which may add 500 lb. to the weight of wooden members after some service, is entirely eliminated. Metal hulls remain watertight and may readily be repaired by cover plates if punctured.

The Factory as an "Attractive Nuisance"

An Industrial Plant May Incur Serious Liability Through Injuries to Trespassing Children Attracted by Its Equipment

BY LESLIE CHILDS*

FAILURE to guard factory premises from access by children has frequently proved a costly mistake in management. Under the doctrine of "attractive nuisance" children, attracted by the nature of industrial equipment, may be held to have rightfully entered the premises, upon the implied invitation of the owner.

If such a child suffers injury, through contact with the plant machinery or equipment, the owner may be placed in a difficult position to defend an action for damages. The possible danger to industrial plants in situations of this kind is illustrated in a striking manner in the recent Texas case of Duron vs. Beaumont Iron Works, 7 S. W. (2d) 867, which arose under the following facts:

Machinery Attracts Children

In this case the defendant was engaged in the manufacture and sale of iron and machinery. It maintained an A-frame derrick, painted a salmon color, which stood in bold relief against materials and other equipment.

This derrick was upon the defendant's premises, located in a factory district, and access was easy by way of a spur track, which ran by the derrick and was frequently used as a footpath by people traveling in that vicinity. It does not appear that the premises of the defendant were guarded by a fence or otherwise, but there was evidence to the effect that defendant's employees ordered boys away from the derrick, because of the danger of their playing upon it.

On the day of the accident which resulted in this suit, the plaintiff, a boy between 13 and 14 years of age, accompanied by a younger brother, went upon the defendant's premises and began playing around the derrick. The boys in some manner started the boom of the derrick in operation, the plaintiff got his left hand in the cog wheels of the machinery, and all the fingers with the exception of the thumb were mashed off. Plaintiff thereafter brought action for damages against the defendant for the injury suffered.

This action was squarely based upon the doctrine of attractive nuisance—that the derrick was attractive to children of tender years and that, therefore, it became the duty of the defendant so to guard this machinery as to prevent injury to children who might come in contact with it. On the issue as raised, the trial of the cause resulted in a judgment against the defendant of $5,000. The defendant appealed, and the higher court, in stating the case before it, said:

Attractive Nuisance Defined

"The theory of liability under the attractive nuisance doctrine is that, where the owner maintains a device or machinery on his premises of such an unusually attractive nature as to be especially alluring to children of tender years, he thereby impliedly invites such children to come upon his premises, and, by reason of such invitation, they are relieved from being classed as trespassers, but are in the attitude of being rightfully on the premises.

"Under such circumstances, the law places upon the owner of such machinery or device the duty of exercising ordinary care to keep such machinery in reasonably safe condition for their protection, if the facts are such as to raise the issue that the owner knew, or in the exercise of ordinary care ought to have known, that such children were likely or would probably be attracted by the machinery, and thus be drawn to the premises by such attraction. . . ."

Following the foregoing statement of the legal principle involved, the court turned to the record to ascertain whether or not the evidence was sufficient to hold the defendant liable thereunder. In reviewing the record, and in passing upon this question, the court used the following language:

What the Court Decided

"We think the evidence amply supports the findings of the jury. In the first place, the photograph of the hoisting derrick, . . . shows a device which a jury might conclude was well calculated to attract the eye of childhood. It was painted an attractive salmon color, and stood in bold relief, bright and attractive in the sunlight, while everything else about it was black, dirty and greasy.

"The giant boom . . . at the time of the accident was raised and extended some 40 or 50 ft. in the air. It and the derrick also were latticed with steel strips, which rendered it easy to climb, thus constituting a mute appeal to the climbing propensities of the average boy. Connected with the machine were pulleys, cylinder drum, cogwheels, ropes, and there was a platform leading up to it.

"The machine was not one in such general use as to be familiar to the average child. Each of the boys testified that he was attracted by the machine and went over to examine it and see how it worked. They also stated that they had passed by the machine many times, and had been theretofore attracted by it, but on these occasions had not had time to play with it; that they had made up their minds to go over and see how it worked as soon as they got a chance. . . .

"The device in this case was of such a nature as to be not only attractive for climbing purposes, but the machinery connected therewith which operated the giant boom was reasonably calculated to, and it seems did, arouse the curiosity of the injured boy and his brother. It also appears that the attractiveness of this device had theretofore allured other boys to inspect it. . . . We find no error presented that demands a reversal of the judgment of the trial court. . . . Judgment . . . affirmed."

In the light of this decision and other holdings it would be well for every owner or operator of an industrial plant to ask: "Is there upon my premises any machinery, equipment or condition that may fairly be termed an attractive nuisance?" And, if the answer is in the affirmative, a judicious expenditure, in erecting fences, walls or other barriers that will make the premises proof against access by children may prove a wise investment.

*332 East Vermont Street, Indianapolis.

Forging Machines of Heavier Design

Low-Weight Accurate Forgings Produced, with Pierced Holes That May Be Finished by Broaching

PROGRESS in the manufacture of machine forgings was reflected in the improved forging equipment and methods demonstrated recently by the National Machinery Co., at its Tiffin, Ohio, plant.

New models of high-duty forging machines, ranging in size from 2 to 7½ in., the latter weighing 365,000 lb. and said to be the largest ever built, were shown. These are of more rigid construction than those previously built by the company and are arranged so that the forging tools are maintained in the close alinement necessary for accurate work. To the development of machines of sturdier type is attributed the progress in the methods of manufacture and the improved quality of the machine forgings.

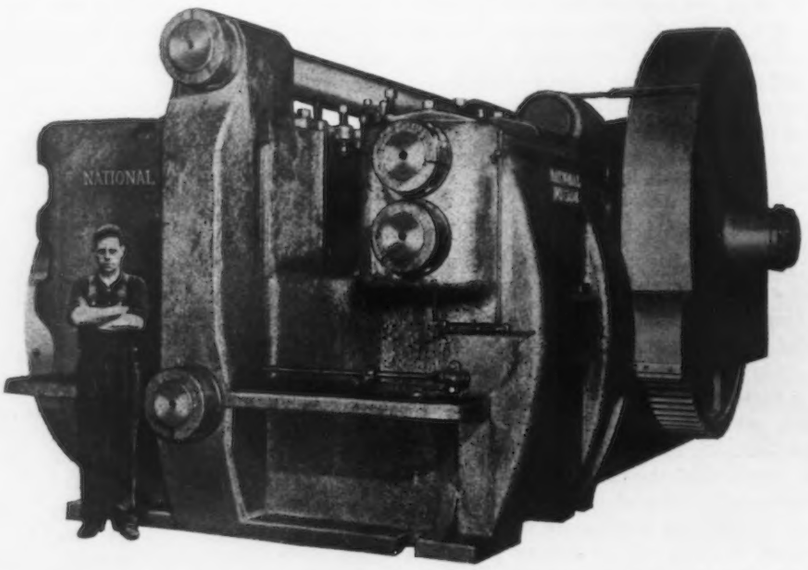
Low weight forgings of the internal displacement type are produced with pierced holes that are accurate within 0.015 to 0.020 in. of size, so that drilling is eliminated and the holes may be finished by broaching or reaming. The newer models also require less material to forge and a minimum of machining to finish. In accuracy of size and shape the forgings are said to approach die castings, and require the removal of only 1/32 to 1/16 in. of metal in finishing.

The majority of the machine-made forgings are produced without flash, and where there is a flash it is usually slight and is trimmed off in the dies. There is considerable saving in the cost of material by buying unannealed stock, it is pointed out, because the stock in being cut hot in the forging machine does not require annealing. The scrap produced by the forging is limited usually to a short crop end and a very small slug from the hole.

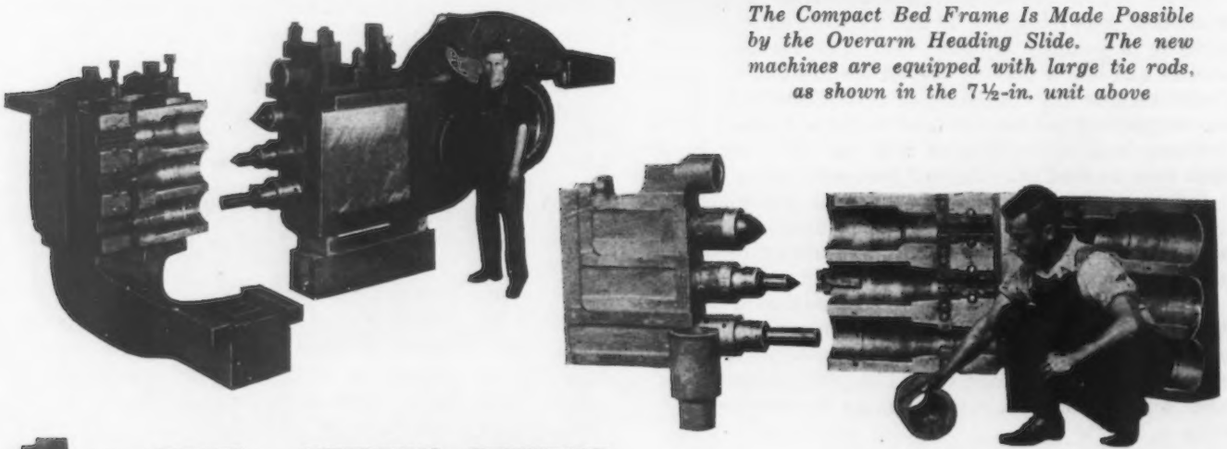
The new machines have short compact bed frames, much of which are located below the floor line. In addition, massive tie bars are used to resist tension stresses. Compactness of the bed frame has been made possible, as in the company's previous line of machines, described in THE IRON AGE of Feb. 18, 1926, by the overarm heading slide which extends over and beyond the crankshaft. This added length of slide, together with the narrow width, is said to provide an accuracy of movement to the heading slide that makes possible the internal displacement forging process. The same principle is applied to the grip slide, the long outboard support being a factor in securing close registration of die impressions. This construction, combined with powerful gripping action, is emphasized as keeping the dies closed against the hydraulic action of the heading tools on the hot stock and preventing swollen shanks and part line flash, the elimination of which materially increases the life of the dies.

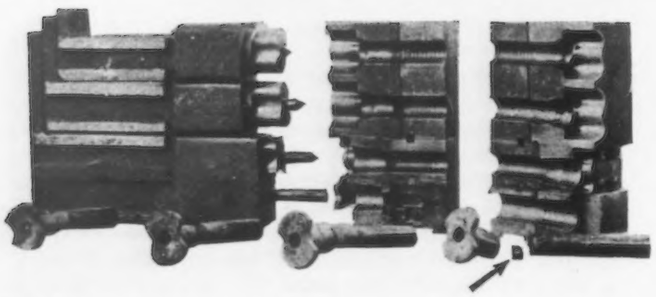
Forgings Pierced Progressively

Progressive piercing of various types of forgings may be done on these machines. In deep piercing the stock is spread until it reaches the confines of the pierced die impression, there being no extrusion or lengthening of the upset portion. A recent



The Compact Bed Frame Is Made Possible by the Overarm Heading Slide. The new machines are equipped with large tie rods, as shown in the 7½-in. unit above





Heading and Gripping Slides Are Shown at the Upper Left. Dies for forging an oil well drilling tool joint are above, these dies and the slides shown at the upper left being used in the 7½-in. machine

Steps in Forging a Tractor Hub Are Shown at the Left. The hole is 1 9/16 x 5 5/8 in. The slug left at completion is indicated by the arrow

development is a die arranged so that the forging may be partly sheared from the bar, with the shear serving as a backing in the die against which the stock is forced by the piercing tool, thereby squaring the end. Being still attached to the bar, the forging can be transferred to another impression in the die in which the shearing operation is completed.

The making of forgings from the bar and piercing a hole completely through the blank is an important application of deep piercing on these machines. The blank is sheared from the bar, carried over into the die impression and on the same stroke a hole is punched through the blank. The thickness of wall of the pierced forging may range from that approaching seamless steel tubing up to several times the diameter of the pierced hole.

One application of the new 7½-in. machine, shown in the illustration, is in making a hollow tool joint used in oil well drilling. This forging is 15½ in. long and its outside and inside diameters at the large end are 8¼ in. and 6⅛ in. respectively. This forging is made in three steps, the first being two internal displacement operations and the third the punching of a small slug in the bottom. This machine weighs 365,000 lb. and requires four flat cars for shipment. The heading slide is 10½ ft. long and the driving motor is 150 hp. The machine is intended for continuous production of various types of large upset work.

Segment Wheel for Blanchard Grinder

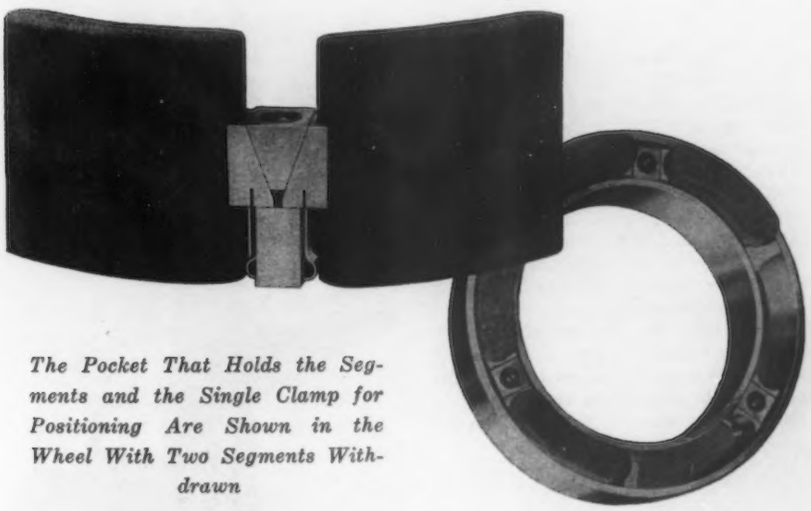
SAVINGS in abrasive cost on medium and broad surface work is claimed for the segment wheel illustrated which has been made available by the Blanchard Machine Co., Cambridge, Mass., for use on its direct-motor-drive No. 16 surface grinder.

Less rapid wearing of the abrasive segments, as compared to a cylinder wheel, is said to be due to the spaces between the segments, which allow the particles ground from the work to escape easily from under the wheel. It is stated that on suitable work the life of the segments is about twice that of the cylinder wheel. Cutting is cooler and faster, less power is used and a wider variety of work can be ground without changing the grade of the segments.

Six abrasive segments held in position by three simple clamping devices are carried by a chuck, the body of which is machined from a solid piece of steel and is rust proofed. The three fixed abutments and three clamping units are of aluminum bronze, the screw in the clamping unit being of stainless steel. The ends of the segments, being round, have no corners to crack off. When the clamping screw is tightened the segments are forced outward against the surface of the chuck body and against the fixed abutments, a large area taking the clamping pressure.

More than 5 in. of the segments, which when new are 6 in. deep, can be used and as they wear down they may be set out a distance of 2 in. from the chuck. This adjustment is made by running the magnetic chuck under the wheel, unclamping the segments, one pair at a time, dropping them down to the face of the magnetic chuck, using a sheet of cardboard or other material to protect its surface, and then reclamping in place. The clamping screws are located so that dirt cannot get into the threads to interfere with the removal of the wedge.

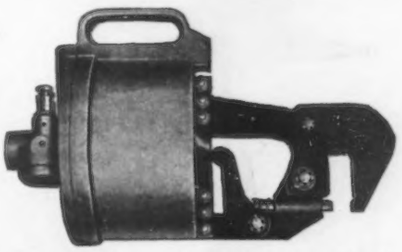
The segment wheel is not adapted for pieces that cannot be held securely, such as gear blanks which rest on a small hub, or work which is high and has little area in contact with the magnetic chuck.



The Pocket That Holds the Segments and the Single Clamp for Positioning Are Shown in the Wheel With Two Segments Withdrawn

Portable Machine for Squeezing Light Rivets

A NEW portable pneumatic riveter that squeezes instead of hammers light rivets into place is being manufactured by the Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York, in two sizes. The smaller unit, weighing 8 lb., is designed for driving steel rivets up to ⅛ in. in diameter, duralumin rivets up to 5/32 in. and aluminum rivets up to 3/16 in. The larger machine weighs 16½ lb. and has capacity for driving 3/16 in. steel rivets, 5/16-in. duralumin rivets and ⅜-in. aluminum rivets.



Squeeze Riveter for Light Sheet Metal Parts. Interchangeable yokes adapt the machine for pieces of various size

The yoke is arranged so that it may be removed conveniently and replaced by another. Interchangeable yokes, which provide different sizes of gap and reach, permit use of the one machine for a variety of work.

Engineers Consider Fuel Problems at Cleveland

THE second National Fuels meeting conducted under the auspices of the Fuels Division of the American Society of Mechanical Engineers was held at Hotel Cleveland, Cleveland, Sept. 17 to 20, with a registered attendance of about 750. Victor J. Azbe, chairman of the Fuels Division, presided at the opening session. Thirty technical papers were presented during the four-day meeting. Separate sessions were held for various subjects and industries. These included industrial, powdered fuels, heat transfer, fuel characteristics, smoke abatement, refractories and stoker, central station and other sessions. The sessions were well attended and a great deal of interest was shown in the discussions.

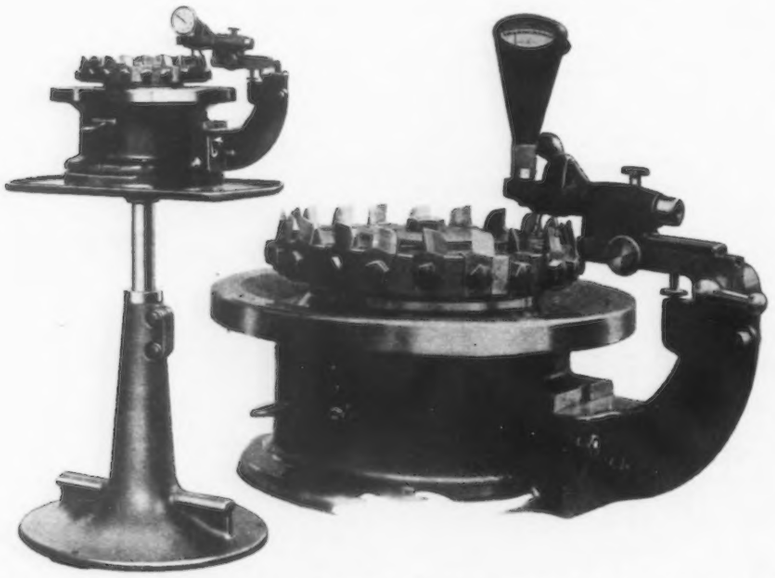
Another fuels meeting is being planned for next year, to be held in the East, probably in New York.

Abstracts of several of the papers read last week will appear in later issues of THE IRON AGE.

The Aetna-Standard Engineering Co. is moving its quarters from the Realty Building in Youngstown to the Home Savings & Loan Building, where it has leased larger space. The company is also concentrating its engineering department in Youngstown, bringing engineers from Warren and Ellwood City, Pa.

Gleason Spiral Cutter Truing Fixture

CIRCULAR cutters used in connection with Gleason spiral bevel gear generators may be trued up accurately on the fixture illustrated. accommodates the various sizes of spiral bevel gear cutters and has a large handwheel attached directly to it for turning the cutter to the point



The Fixture Facilitates Accurate Truing of Spiral Bevel Gear Generator Cutters

which has been placed on the market by the Gleason Works, Rochester, N. Y.

Heretofore these cutters have been checked, in most cases, on the generators. The truing fixture not only permits more accurate and more convenient checking of the cutters, but it releases the more expensive machines for production work. After truing, the cutters may be placed on the generator and used without further checking, provided the cutter spindle of the generator runs true.

The fixture is of simple design and is mounted on a rigid base, which is adjustable for height. The spindle desired for checking. A lever at the front of the fixture serves to lock the spindle, this lock being used also when mounting or removing the cutter from the spindle. The spindle is mounted on carefully selected precision ball bearings and is ground in its own bearings. It is stated that the runout is thus reduced to within 0.00005 in.

Several different measuring instruments may be used in connection with the truing fixture, all of which read to 0.0001 in. By the use of a finger device operated through a system of levers, one indicator is used for checking both the inside and the outside of the cutting blades.

New Slip Roll Former

A SLIP roll former which is a departure from its split-bearing top roll lifting type machine has been brought out by the Niagara Machine & Tool Works, Buffalo. A special gear arrangement permits parting the front rolls sufficiently to allow folded edges of sheets to pass through.

Arrangement of the machine may been seen in the illustration. A trigger release and knurled roll handle are located on the same end of the machine and upon completion of the forming operation the trigger release is pulled and the top roll swung forward in one movement. It is stated that this is accomplished in less time than is necessary in opening rolls of the split-bearing type.

The machine is provided with a heavy box section base to assure permanent alinement of rolls, bearings and housings, and tie rods are not employed. A full bearing sleeve is provided on the movable end of the front roll, which in the operating position is held in place by the trigger mechanism. When the upper roll is moved forward to permit removal of the work, the bearing sleeve remains in place on the roll, protecting the bearing from dirt and grit. Gears are of steel, machine cut, and are entirely inclosed.

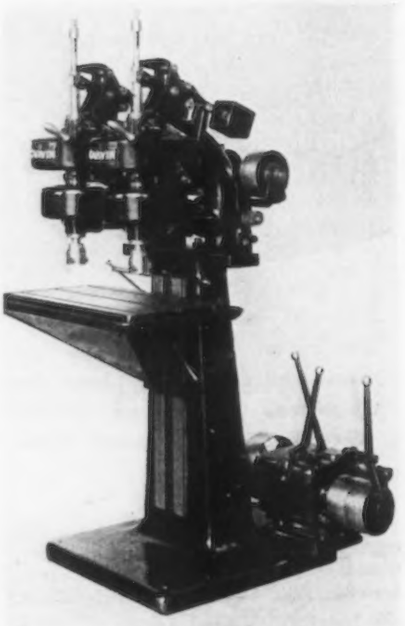
Sheet metal up to No. 22 gage may be formed on the machine, three sizes of which, with rolls 2 in. in diameter and 30, 36 and 42 in. long, respectively, are available. The weight of the machine ranges from 195 to 265 lb.



The Trigger Adjacent to the Roll Handle Permits Simultaneous Release and Pulling Forward of the Roll

Roller Bearing Speed-Box for Garvin Tappers

FOR use on Garvin No. 2-X and No. 2-BG automatic tapping machines, the Western Machine Tool Works



Four Selective Speeds Are Provided by the Speed Box, Which Is Taper Roller Bearing Equipped

Holland, Mich., has brought out a new tapered roller bearing speed-box which is intended to eliminate the single-speed speed-reducer. The speed-box may be furnished either for direct motor drive or single pulley drive machines, the latter being illustrated herewith. For direct motor drive, a base is furnished; for single pulley drive arrangement the unit is bolted directly to the base of the tapping machine. Four selective speeds are provided so that direct shifting

may be made from one speed to another.

The speed box is equipped throughout with Timken tapered roller bearings. Gears are of chrome-nickel steel, heat-treated and hardened. Long bearings are provided for the two sliding cone gears to prevent chattering and to facilitate shifting. The gears are of coarse pitch and the ends of the teeth are rounded for easy engagement. The gears, bearings, shafts, shifter forks and lever fulcrums are lubricated by the bath of oil in the box. Shift levers are located within convenient reach of the operator.

All shafts are ground and are provided with fine threaded nuts for close adjustment of the roller bearings, the adjustment being made from the outside of the box. With a 1200-r.p.m. motor the spindle speeds of the No. 2-X automatic tapper are 223, 300, 432 and 582 r.p.m. and of the No. 2-BG tapper, 56, 76, 109 and 149 r.p.m. With an 1800-r.p.m. motor the spindle speeds of the No. 2-BG machine are 84, 114, 163 and 224 r.p.m.

Mult-Au-Matic Center Lathe Announced by Bullard Company

A SIGNIFICANT development in manufacturing equipment for the automotive and other industries employing quantity-production metal cutting methods is a Mult-Au-Matic center lathe, announced recently by the Bullard Machine Tool Co., Bridgeport, Conn. The new machine is offered as providing for shaft turning the economies afforded by the chucking type of Mult-Au-Matic, one model of which was described in THE IRON AGE of Dec. 8. 1927.

The number of automotive and other parts for which the new machine is adapted is said to be as great as in the original chucking field, the savings in production time being also comparable. As an example of the latter the company cites a reduction from 3½ min. per piece in machining the spindle and brake drum flange of a steering knuckle forging on a single-spindle machine to 50 sec. on the Mult-Au-Matic center lathe. The time on a stem pinion requiring 4½ min. on a horizontal machine is reduced to 50 sec.

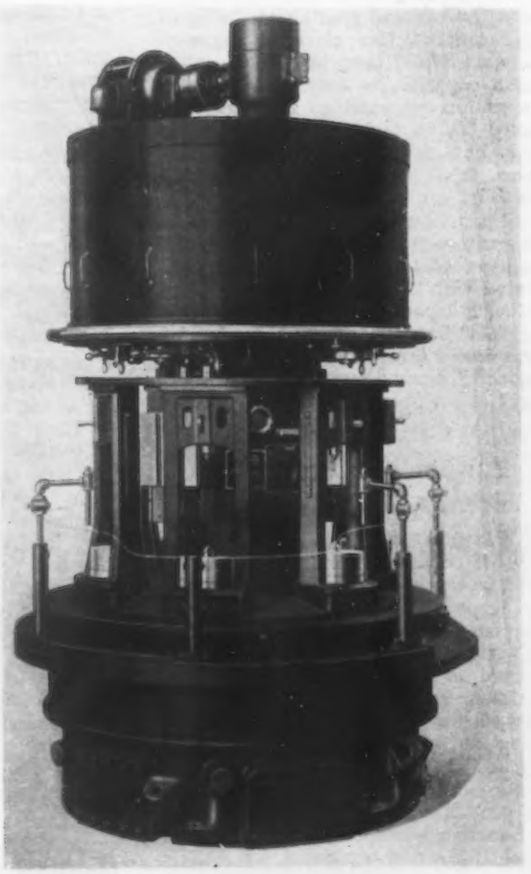
On the Mult-Au-Matic lathe six pieces are in process at one time and the individual operations on each piece are in sequence. Spindle speeds and tool feeds at each station can be set to suit the exact requirements of the work at the respective stations, which is emphasized as not only assuring maximum efficiency in each work unit, but as offering a further economy in tools, tool grinding and down time for tool change. It also permits intensive tooling without crowding and inaccessibility and facilitates the balancing of all operations and work units to be completed in the same length of time. The independent speed and feed arrangement at each station is further said to be easier on the tools and the work.

Pieces to be machined are set vertically, on end, between centers. In addition to concentricity in running and wearing of the work spindle on its bearings, a number of advantages are claimed for the vertical mounting. A live center tail-stock is mounted above, between guides secured to the work-spindle carrier, and is held firmly in place by a steady-ring. These tail-stocks are adjustable to accommodate work up to 12 in. in length between centers. The tail-center is operated by a lever, one movement of which drops the center in place and binds it. The work is held and driven at its lower end by a power-operated chuck or other device mounted on the work spindle, and the pressure of all feeding cuts, except in underfacing, is carried against this lower bearing.

The registering position of the work spindle in operation is not directly below the tool head as in the Mult-Au-Matic for chucked work, but is between the tool faces of the column. The arrangement is such that the tool slides and heads on the faces of the column are vertically and horizontally traversed to the point of cutting and retired to permit clearance in indexing the work.

The first station of the machine is without a tool head and is for unloading and loading the work. The other five stations have tool heads, which are arranged for rapid traverse downward and to the left to the point of cutting, where the feed motion is engaged. The tools feed through the cut and are then retired from the surface and returned to their initial high position.

Clearance is provided for turning work up to 4 in. in diameter for the maximum length of 12 in. and for 10 in. in diameter up to approximately 7¾ in. above the spindle. There is also clearance for facing flanged pieces. Setting of tools on the slides may be by individual or block-type combination tool-holders; they are firmly secured in place and are accessible for adjustment or change of tool bits. Individual speeds and feeds for each head are obtained by means of change gears on brackets in the upper compartment.



PARTS for Which the Mult-Au-Matic Center Lathe Is Adapted Are Said to Be as Numerous as in the Original Chucking Field. There are six stations, one of which is for unloading and loading the work, and operations are in sequence. Spindle speeds and tool feeds at each station can bet set to suit exact requirements. The work is mounted vertically, on end, between centers. Clearance is provided for turning work up to 4 in. in diameter for a length of 12 in.

Thorough attention has been given to the lubrication of bearings and other wearing parts, and a complete coolant system has been provided. The drive is by a 10-hp. constant speed motor through flexible coupling. The height of the machine to the top of the drive bracket is 128 in. and floor space requirements are a circle approximately 77 in. in diameter. In addition space of 25 x 29 in. is required for the coolant tank.

Heavy Increase in Orders for Steel Castings

WASHINGTON, Sept. 24.—Orders for steel castings in August totaled 80,932 tons, or 56 per cent of the capacity of 144,200 tons of the 129 reporting producers, according to the Department of Commerce. This represented a sharp increase over July orders, which amounted to 66,667 tons, or 46 per cent of capacity. Production also rose in August, aggregating 86,809 tons, or 60 per cent of capacity, against 78,324 tons, or 54 per cent of capacity, in July.

For the eight months ended with August orders were 654,529 tons, or 57 per cent of capacity, compared with 674,963 tons, or 59 per cent of capacity, for the corresponding period of last year. Production for the first eight months of 1928 totaled 690,063 tons, or 60 per cent of capacity, while for the eight-month period of 1927 production was 714,953 tons, or 62 per cent of capacity.

Of the August orders, 25,171 tons was for railroad specialties, being 37 per cent of this class of capacity, against 20,483 tons, or 30 per cent of such capacity, in July. Bookings of miscellaneous castings in August totaled 55,761 tons, or 73 per cent of this kind of capacity, against 46,184 tons, or 60 per cent of such capacity, in July.

Production of railroad castings in August was 27,157 tons, or 40 per cent of this class of capacity, compared with 27,501 tons, or 41 per cent of such capacity, in July. The output of miscellaneous castings in August was 59,652 tons, or 78 per cent of such capacity, against 50,823 tons, or 66 per cent of such capacity, in July.

Automobile Production Breaks Monthly Record

WASHINGTON, Sept. 21.—Totaling 458,513, production of passenger cars and trucks in the United States broke all records in August. The passenger car output was 398,689 units and 59,824 trucks were produced. The previous record of passenger car production, 397,332, made in October, 1925, was exceeded by 1357 last month, while the previous truck production record of 58,651, in September, 1925, was exceeded by 1173. The previous record of combined passenger car and truck production was 442,114 units, in October, 1925, now exceeded by 16,399. Passenger car and truck production in July, 1928, totaled 391,180.

Production of both passenger cars and trucks during the first eight months of 1928 totaled 3,051,304, of which 2,702,514 were passenger cars and 348,790 were trucks. Output during the corresponding period of last year was 2,646,285 units, of which 2,313,869 were passenger cars and 332,416 were trucks. Only in 1926 was the 1928 record surpassed, with 3,144,466 units in eight months, of which 2,801,720 were passenger cars and 342,746 trucks. Truck production this year has made the highest total ever reached in the first eight months. Not only has it exceeded that of the first eight months of 1926, but also that of 1925, which showed in 12 months the greatest total of trucks (505,245) ever yet made in this country.

August production of automobiles in Canada, as reported to the Department of Commerce by the Dominion Bureau of Statistics, was as follows: Passenger cars, 24,274; trucks, 6971. This compares with 20,122 and 5104 respectively in July, and with 10,139 and 2387 in August of last year.

Foundry Equipment Orders Rise

Bookings of members of the Foundry Equipment Manufacturers Association in August were larger than for any month except May, this year, since 1924. The index of both gross orders and net orders for 19 companies was 278, using average monthly shipments for the years 1922, 1923 and 1924 as a base of 100. The index of gross orders in May, 1928, was 335.6. The index of shipments in August was 154.1, while unfilled orders at the end of the month stood at 467.2, or about the equivalent of three months' shipments at the current rate.

Employment Gains in Ohio Metal-Working Plants

Employment in Ohio iron and steel companies increased 3 per cent in August as compared with July, and 7 per cent as compared with August, 1927, according to the current bulletin of the bureau of business research of Ohio State University. The improvement was shared by 95 of the 160 reporting companies. In the first eight months of 1928 the average number of wage earners was 2 per cent less than during the same period last year. The index for the machinery group in August stood at 110, or 1 per cent greater than in July and 3 per cent greater than in August, 1927. The increase came from 57 of the 94 reporting concerns. Among automobile and automobile parts manufacturers the August employment index of 94 is four points higher than in July and 16 points higher than in August, 1927.

Increase in Coke Production

Production of by-product coke in August is reported by the United States Bureau of Mines at 3,994,924 net tons. This represents a gain of more than 2 per cent over the July figure of 3,911,082 tons. Correspondingly there was a gain in output of beehive coke, from 271,000 tons to 288,000 tons, making the total coke produced in August 4,282,924 tons. The gain over July was almost precisely 100,000 tons. Compared with August, 1927, the gain was 116,500 tons, or nearly 3 per cent.

Steel Furniture Orders Are Far Above Last Year

WASHINGTON, Sept. 22.—Orders for steel furniture in the "business group" in August were valued at $2,619,230, against $2,594,216 in July, according to reports received by the Department of Commerce from 34 producers. Shipments were valued at $2,564,633 and $2,515,482 respectively, and unfilled orders at $2,118,633 and $2,071,553 respectively. Orders for the eight months ended August, 1928, were valued at $23,805,868, against $20,655,390 for the corresponding period of last year.

Orders in the "shelving group" in August were $863,420, compared with $713,330 in July, according to reports received from 16 manufacturers. Shipments were valued at $836,104 and $722,516 respectively, and unfilled orders at $734,365 and $705,655. Orders for the eight months ended August, 1928, were valued at $6,138,545, compared with $4,997,919 for the corresponding period of last year.

Further Rise in Commodity Price Index

Commodity prices in August are reported by the United States Bureau of Labor Statistics at 98.9, on a base of 100 as the average of 1926. This is a fractional increase over the July figure of 98.3, which itself recorded a gain from the 97.6 of June. The figure was 95.2 in August, 1927; hence the year has shown an increase of 3.7 points, or about 3.8 per cent.

Foods, fuels and metals recorded the principal gains during the month. The latter advanced from 98.6 in July to 100.4 in August. This was brought about by fractional advances in iron and steel and non-ferrous metals and a substantial advance in the automobile index. A year ago the metal index stood at 98.

Immigration 20,682 in July

WASHINGTON, Sept. 22.—Immigrants entering the United States in July totaled only 20,682, while the number of emigrants was 7804, according to the Bureau of Immigration. The bulk of the immigrant aliens came from countries in the Western Hemisphere, with Canada and Mexico leading the list. These two countries, with 5234 and 4927 respectively, contributed almost one-half of the total, while Central and South America and the West Indies sent 895.

Germany led the list of European countries, contributing 2205, followed by Italy, 1885, while the Irish Free State sent 1024, Great Britain, 1020, the Scandinavian countries, 778, and Poland, 367. Of the emigrants, nearly 80 per cent, or 6205, went to Europe. Italy, with 1624, received the largest number, while 1060 went to Germany, 599 to Great Britain, 406 to Greece and 416 to Poland.

Offers Tools of Widia Alloy

Higher Efficiency Claimed, Based on Increased Cutting Speeds, and Ability to Hold Cutting Edge

TOOLS and tool bits of Widia alloy, manufactured by Fried. Krupp Steel Works, Essen, Germany, as noted in THE IRON AGE of March 17, 1927, are being placed on the American market by Thomas Prosser & Son, 15 Gold Street, New York. This alloy, which in hardness is said to be only slightly inferior to a diamond, is available in a wide variety of shapes and in sizes up to 1 x 1 x 4¾ in.; also as points for drills ranging in diameter from ⅛ to 2¼ in. The material does not require heat treatment and except for brazing to the shanks and grinding by a special wheel developed for the purpose, the tool bits are ready for use as manufactured.

Claims for the higher efficiency of the Widia tools are based entirely on the greatly increased cutting speeds made possible while retaining the feeds and cuts usually employed with high-speed steel. It is claimed that the metal operates efficiently even with its cutting edge at a bright red heat, as it has no temper to be drawn, and the ability of the alloy to hold a cutting edge is said to be several times greater than that of high-speed steel. Tools of the Widia metal are used successfully for intermittent cuts, and to illustrate the effectiveness of the tool under these conditions the makers cite a recent test of one of the cutters in machining an 11¾-in. cast iron workpiece of 200 Brinell hardness, having two slots 1⅜-in. wide extending the full length. The feed was 0.036 in., the depth of cut 0.59 in. and the cutting speed 655 ft. per min. The intermittent cutting caused by the two slots is said to correspond to 400 blows per min. at the edge of the tool, which at the completion of the test is said to have suffered no injury.

Cutting Qualities Unaffected by Sand or Slag

The cutting qualities of the alloy are also unaffected by sand or slag and in the machining of bakelite, light alloys used for automobile pistons and other material having abrasive characteristics, the tool bits are said to give unusual service. The increased efficiency of the Widia tools as compared to high-speed steel, using the chip cross-section multiplied by the cutting speeds as the basis, expressed in percentage, is given by the company in part as follows: Cast iron, 400 Brinell, 200 per cent; cast iron, 160 Brinell, 600; brass, 800; hard rubber and similar materials, 500; cast iron with silicon up to 16 per cent, 200; manganese steel, 12 per cent mn., 150; rustless steels, 300; and chilled iron, 65 to 90 scleroscope, 400 per cent. Steels of different tensile strengths are said to be machined at 75 to 200 per cent increase in efficiency as compared with high-speed steel.

Widia metal can be brazed to carbon tool steel, but not to high-speed steel, the brazing being done with brass or copper, preferably the latter, at 1150 deg. C. The flame should be reducing, so that when using gas, there should be an excess of gas. The quality of the material is affected by a direct flame and therefore it is desirable to do the brazing in a muffle furnace or to protect it by a wall of fireproof material. After preparing the surfaces of the tip and shank so that they make close contact throughout, the tip is put in place, and the shank and tip heated. The brazing material is then put between the tip and shank and heated until the brazing material runs off on all sides. The tip is then pressed on the shank by means of a light pressure, and the tool then placed in pulverized electrode carbon in order to cool slowly and to protect the edge from the influence of the oxygen in the air.

Sharp Edge Essential

A prerequisite to the successful working of the Widia tools is a sharp edge, which is obtained by means of special grinding wheels. These can be furnished in grades for rough and finish grinding. Wet grinding is preferred and grinding speeds of 3936-4920 ft. per min. are recommended. Overheating by dry grinding must be avoided, as well as too sudden cooling by water, because overheating or sudden cooling tends to crack the material. The grinding machine should be of such design and in such condition that vibration is eliminated. The grinding is said to be accomplished in the same time and at the same cost as the grinding tools of high-speed steel.

When used for intermittent cuts the tool is held very close to the cutting tip and is fixed very firmly to eliminate vibration and chatter, which must also be absent in the case of revolving tools of Widia metal. To avoid damage to these tools, they must be removed from the cutting position when the machine is stopped for gaging of the work or for other reasons. For heavy cuts a side slope of 3 to 5 deg. is recommended so that the chip may be guided to one side of the tool.

Tool angles recommended for turning, boring and milling with the Widia alloy range from a clearance of 4 deg. and a lip angle of 82 to 86 deg., for chilled iron to 6 to 8 deg. clearance and 60 to 75 deg. lip angle for cast steel. For planing tools the clearance is 4 deg. and the lip angle is approximately 5 to 10 deg. greater than that of the turning tools. In planing and shaping operations it is necessary that the tool be lifted from the work on the return stroke of the tool. In turning, the tool must be located at or slightly above the center line of the work and, in boring, the tool should be at the center line.

Electrochemists Honor Edison

The American Electrochemical Society, in session at Charleston, W. Va., Sept. 20 to 22, bestowed upon Thomas A. Edison, a member of the society since the year of its inception, the distinction of honorary membership. Edison's achievements in the electrochemical field are well known. His alkaline storage battery set a new standard for high capacity at minimum weight. He has also contributed many valuable processes and products in the electrochemical plating art. The phonograph record owes its very existence to high perfection in electroplating.

Cartel Output to Be Unchanged in Last Quarter

WASHINGTON, Sept. 25.—The International Steel Cartel at a meeting in Luxemburg, Sept. 14, voted to continue production during the closing quarter of 1928 at 7,321,750 metric tons, the level maintained in the earlier quarters of the year, says a cablegram received by the Department of Commerce from the commercial attaché in Brussels.

Following the action of the conference at Düsseldorf, July 13, when the Central European Steel Cartel was abolished, Czechoslovakia, Austria and Hungary were allotted separate tonnages instead of the group allotment that had been in effect. The combined allotment, however, continues the same as when they were in the Central European Steel Cartel.

At a meeting, Sept. 10, the machine wire cartel voted to increase the export price of its product 2s. 6d. (61c.) per ton.

Pittsburgh Steel Co. Profits Decline

The Pittsburgh Steel Co., Pittsburgh, had net income after all charges in the year ended June 30, 1928, of $1,342,141. This compares with $1,951,958 in the previous fiscal period and with $2,533,577 in the year ended June 30, 1926. Other comparisons with the 1926-27 period are not available. Total inventories as of June 30, 1928, amounted to $11,086,199 as against $9,105,955 on June 30, 1926. The largest gain was shown in finished steel products, the stock at the end of the 1928 fiscal year having stood at $3,617,727, as compared with $2,319,124 in 1926. Average number of employees at the company's steel works in the 1927-28 period was 4520 as against 4834 in the 1925-26 fiscal year. Shipments of finished steel products during the most recent period amounted to 384,083 net tons.

Discuss Aircraft Manufacture

Mechanical Engineers on Ohio River Trip Deplore Relative Ease of Establishing Plants

ASHLAND, KY., Sept. 25.—With approximately 225 members and guests on board the steamboat Cincinnati, en route to Ashland, Ky., to inspect the continuous sheet mills of the American Rolling Mill Co., the first technical session last night of the national machine shop practice meeting of the American Society of Mechanical Engineers created more than normal interest. A paper by Hugh W. Roughley, quality manager Wright Aeronautical Corporation, Paterson, N. J., read in the author's absence by L. C. Morrow, described in detail the inspection methods and quality control in the manufacture of aircraft engine parts and was the feature of the session. That the airplane industry is getting out of the purely experimental stage to a stabilized basis, comparable with that of the automobile industry fifteen to twenty years ago, was the report made by Eric Oberg on the consensus of opinion of men attending an aircraft meeting held at Wichita, Kan., last week. The greatest need of the industry today is a small reliable reasonably priced motor for small planes. Unfortunately the airplane industry is one of the cheapest lines in comparison with the price of the product into which a manufacturer can put his resources Little equipment is needed and the time necessary for getting into production is remarkably short, so that many builders who know nothing about the business are attracted to that field. The result is likely to be that the industry will acquire a bad reputation from which it will require much time to recover.

Bennett Chapple, vice-president American Rolling Mill Co., made a short talk in regard to the continuous rolling of sheets at Ashland. R. E. Flanders, manager Jones & Lamson Machine Co., Springfield, Vt., presided in the absence of Capt. E. E. Aldrin, Wright Field, Dayton, Ohio. After the trip through the Armco plant today, the technical sessions will be continued tonight aboard the Cincinnati and Wednesday morning at the Hotel Sinton, Cincinnati.

Scrap Freight Rates Asked on Defective Material

WASHINGTON, Sept. 25.—Briefs have been filed with the Interstate Commerce Commission by steel makers, jobbers and others interested, asking that rates no higher than the billet or scrap rate be established from Pennsylvania, Ohio, West Virginia and Kentucky points to Youngstown, Cleveland and Detroit on wasters and other defective materials. Tariffs proposed by the carriers, now under suspension, call for the same rates on wasters as those applying on prime finished material. The proposed billet or scrap rate, the briefs contend, would be in conformity with the commission's decision in the Wrought Washer Mfg. Co. case.

$2,000 Award for Best Industrial Advertising

Again the Harvard advertising awards committee of the National Industrial Advertisers Association has announced the annual Bok award of $2,000 for the best industrial advertising campaign for 1928 appearing in newspapers and periodicals. Closing date of this competition is Dec. 31.

To enter competition for this award, the industrial advertisers must submit a manuscript describing the campaign, its functions and its application, together with reproductions of the "ads" as they appeared and a statement of the analysis of the market on which the campaign was founded. The manuscript and the ads must be submitted in prescribed form. the details of which may be secured from the Harvard Graduate School of Business, Soldiers' Field Station, Boston, or from A. H. Oberndorfer, Sivyer Steel Casting Co., Milwaukee, chairman awards committee, National Industrial Advertisers Association.

New York Favors Structural Steel Standard

An amendment increasing the working stress in structural steel has been adopted by the New York Board of Aldermen, which is expected to save builders in that city approximately $6,000,000 on current contracts for new structures. The amendment is based upon a standard specification of steel construction recommended by the American Institute of Steel Construction and was introduced by a committee representing the New York and Brooklyn chapters of the American Institute of Architects, the American Institute of Consulting Engineers, the Building Trade Employers Association, the Iron League of New York and the New York and National Boards of Fire Underwriters.

The old building code permitted a basic working stress of 16,000 lb. per sq. in., but under the amendment the basic working stress may be increased to 18,000 lb. per sq. in. This reduces the amount of steel going into a building roughly by 10 per cent. By reason of this change, estimated on current contracts, the city itself will save about $500,000 a year on school buildings alone.

Commenting upon the amendment, Charles F. Abbott, executive director American Institute of Steel Construction, said: "The amendment will bring the building code of New York into conformity with the codes adopted by practically all cities of the United States as a result of our recommendations. We hope that steel construction, rendering buildings fireproof, will ultimately supplant all of the present non-fireproof structures."

New Sales Agency for Copper Formed

The Phelps Dodge group of copper producers has formed a new selling agency through which to market its copper, to be known as the Phelps Dodge Sales Co., Inc. Beginning Oct. 1, the new company will market all copper heretofore sold by the Phelps Dodge Corporation and the Nichols Copper Co., control of which is owned by the Phelps Dodge Corporation. That will include the product of the Phelps Dodge Corporation, the Calumet & Arizona Mining Co., the Old Dominion Co., also of the Nichols Copper Co., and its clients, including the United Verde Extension Mining Co. and the Granby Consolidated Mining, Smelting & Power Co., Ltd.

The officers of the Phelps Dodge Sales Co., Inc., will be Walter Douglas, chairman of the board; C. Walter Nichols, president; Gordon R. Campbell, vice-president; A. T. Thomson, secretary and treasurer; Walter C. Bennett, chairman of the advisory committee; Charles A. Austin, manager of sales, and Martin H. Crego, assistant manager of sales.

The directors will be Walter Douglas, C. Walter Nichols, Gordon R. Campbell, Cleveland E. Dodge and Walter C. Bennett. Mr. Douglas, the chairman of the new company, is the president of the Phelps Dodge Corporation, while Mr. Nichols is president of the Nichols Copper Co.

The offices of the Phelps Dodge Sales Co. will be at 99 John Street, New York.

Exhibit of Highway Equipment at Mexico City

A special train carrying 450 American delegates to the second Mexican Highway Congress will leave San Antonio, Tex., Sept. 28, en route to Mexico City. A feature of the congress will be an exhibition of highway building equipment, covering 125.000 sq. ft. of floor space. Exhibits will be shown by 100 manufacturers of the Western Hemisphere, of which 85 will be from the United States.

Steel Barrel Shipments

Shipments of steel barrels by members of the Steel Barrel Manufacturers' Association in August totaled 380,343 units. The volume of business for the month was $1.093.889. Unfilled orders at the end of August were for 358,581 units. Productive capacity was engaged during the month at an average of 56 per cent, light barrel capacity being employed at 63 per cent, against 27 per cent for I.C.C. barrels.

Acheson Establishes Prize Fund

Inventor of Graphite and Carborundum Donates $25,000 for Benefit of American Electrochemical Society

AT the fifty-fourth convention of the American Electrochemical Society at Charleston, W. Va., Sept. 20 to 22, Dr. Edward Goodrich Acheson, known the world over for his electric furnace products, presented to the society $25,000 as a trust fund. This is to form the basis of an award every second year of a gold medal and a prize of $1,000 to any man who has made a distinguished contribution to any of the branches fostered by the American Electrochemical Society.

Dr. Edward Goodrich Acheson was born on March 9, 1856, at Washington, Pa., where his grandfather, coming from Ireland, settled in 1788. In 1880 Doctor Acheson entered the employ of Thomas A. Edison at Menlo Park, N. J., then a "fountain head of chemical knowledge and experiment." His first position was that of assistant draftsman under John Kruesi, father of the present president of the American Electrochemical Society. In July, 1881, Doctor Acheson was sent as first assistant engineer of the Edison interests to the electrical exposition in Paris. He returned to the United States in 1884 and for a time was connected with the Consolidated Lamp Co. of Brooklyn and the Standard Underground Cable Co. of Pittsburgh. The spirit of experiment was strong with him, and electrical and chemical problems engaged his spare hours.



EDWARD G. ACHESON

Early in 1891, Doctor Acheson produced in the electric furnace the first sample of carborundum, the well-known abrasive and refractory. Not long after the invention of carborundum, Doctor Acheson produced the first large sample of artificial graphite. He took ordinary coke and heated it to extremely high temperatures in his electric furnace, the hard brittle coke being transformed into a soft, unctuous product, graphite. And this graphite, which he thus produced artificially, was better and purer than the natural mineral "plumbago" or "black lead" as natural graphite is commonly called. Today about 20,000,000 lb. of Acheson graphite is produced annually. The applications number a thousand and one: Lubricants, electrodes, crucibles, etc. The tungsten wire of the incandescent lamp owes its existence to "aquadag," an aqueous lubricant of "defloculated Acheson graphite." The range of American guns was increased 20 per cent by surfacing the inner walls with graphite. The product is so fine that it will pass though a chemist's filter paper, which ordinarily retains the finest precipitate.

Doctor Acheson's name is widely known. His career has been a fascinating and fertile one. Untiring in his zeal and highly skilled in the experimental art, he has transformed into realities the visions of his active and imaginative mind.

Wages and Hours in Radio Manufacturing

Analysis of labor conditions in the radio manufacturing industry has been made, by the United States Bureau of Labor Statistics, in such form that the manufacture of radio receiving sets, of loud speakers and of tubes are handled separately. The number of establishments covered was 23, 19 and 18 respectively, with total employees of 10,070, 2428 and 2213 in the three branches of the industry.

Average hours in making receiving sets were 48.4 for a full-time week and 45.8 for the typical week actually worked. These figures are for the latter half of 1927, radio manufacturing being a seasonal occupation, with greatest activity in the second half year. Average earnings were 59c. an hour for male employees and 38.4c. for female, giving an aggregate of 50.8c. for all workers. In this branch of the industry, 58 per cent of the employees were male. Earnings in a full-time week averaged $28.62 for male employees, $18.55 for female and $24.59 for all employees.

In the manufacture of radio speakers the male employees outnumbered the female almost two to one. Average hours were 47.8 in a week. Hourly earnings averaged 55.5c. for male employees and 39.9c. for female, being 50.2c. for all employees. Full-time earnings weekly were given as $26.86 for male employees, $18.67 for female and $24 average.

Making of radio tubes showed a large preponderance of female employees, who aggregated five-sixths of the total. Average hours in a full-time week were 48.6. Earnings of male employees averaged 60.2c. an hour against 40.7c. for females and 44.4c. for all employees. Earnings in a full-time week showed an average of $29.44 for males, $19.74 for females and $21.58 for all employees.

Leading Malayan Tin Companies Merged

Consolidation of important Malayan tin producing companies has just been concluded under the aegis of the Anglo-Oriental Mining Corporation with a view to arranging for single technical direction and a coordinated policy in marketing. Although the names of the companies concerned have not yet been disclosed, it is understood that they control, or will control between them, approximately 12 per cent of the world output of tin.

This is the most recent of several significant mergers in the tin producing industry reported this year. Earlier in the year a large number of Nigerian companies, controlling 65 per cent of the Nigerian output, were absorbed into a single group called the Associated Tin Mines of Nigeria, with a single sales and technical organization. Since then the Anglo-Oriental group, which controls this merged group, has been drawing together a large number of concerns in Burma, Siam and Malaya into a single cooperating organization called the Anglo-Oriental (Malaya), Ltd.

The significance of the latest consolidation is that all these groups will now be associated under single control and the marketing of the greater proportion of the world's tin will in effect be in the hands of three great combines the Dutch, the Patino interests and the Anglo-Oriental group.

German Works to Increase Electric Steel Output

HAMBURG, GERMANY, Sept. 11.—Completion of the new Ruhrtalkraftwerke (Ruhr Hydroelectric Power Plant) some time this winter is expected to greatly increase German production of electric steel, which for the past two years has been from 14,000 to 16,000 tons a month. The power station is being constructed with the financial aid of the steel works in the Ruhr and will supply a part of its current to these plants, which plan to use it to increase their production of electric steel. In some quarters it is estimated that output will be about doubled, while crucible steel production will be further curtailed. As German consumption of electric and crucible steel is only about 20,000 tons a month, it is expected that a large portion of the increased output of electric steel will be exported.

The seventh national exposition of power and mechanical engineering at the Grand Central Palace, New York, Dec. 3 to 8, will include the marine field.

Seek Equalized Freight Rates for Coke

Producers and Consumers of By-Product Coke to Meet Oct. 1 in Attempt to Formulate Satisfactory Schedule

WITH an increased output of by-product coke for domestic use in the Central Western States and with keener competition for a market for this fuel, which in the case of steel plant coke ovens means the disposal of surplus coke, by-product coke producers have renewed their efforts to have new rail rates established on their domestic coke output. They will attempt to agree among themselves upon certain fixed rates between producing and consuming points in the Central Freight Association territory and secure the adoption of these rates in place of the mileage rates that have been proposed by the railroads. Formerly all by-product coke rates were on a mileage basis in this territory. As additional steel plant coke ovens were built and as the output was also increased by new ovens built by commercial and gas plants there was considerable departure from these mileage rates, resulting in a chaotic rate situation. This unsatisfactory situation still exists. In some cases there were different rates covering movements in opposite directions between the same two points. This condition exists today between Valley points and Erie, Pa., the Valley rate to Erie being $1.51 per ton and the rate from Erie to the Valley $1.76 per ton.

Coke producers have held meetings at various times during the past three years to attempt to work out rate schedules between producing and consuming points that would replace the present rates, but they have been unable to reach an agreement Because of the failure of these efforts a new committee was organized last year known as the Producers and Consumers Coke Committee, which is continuing the work.

While the by-product coke producers were trying to iron out their differences of opinion over rail rates, the railroads of the Central Freight Association in June, 1927, prepared a new mileage rate scale for by-product coke, which is still pending. Some of the rates per ton proposed in this scale are as follows:

20 miles and under, $1.01; 50 to 60 miles, $1.51; 80 to 90 miles, $1.89; 100 to 120 miles, $2.14; 120 to 140 miles, $2.27; 200 to 225 miles, $2.77; 300 to 325 miles, $3.28; 500 to 525 miles, $4.16; 725 to 750 miles, $4.67.

Committee to Meet Oct. 1

The Producers and Consumers Committee has held various meetings, at which conflicting views were presented. Another meeting will be held about Oct. 1, and the committee plans to stay in session until it reaches an agreement, even if it takes a week. This committee is under the chairmanship of Murray N. Billings, traffic manager Illinois Steel Co., Chicago. If the committee succeeds in agreeing, its proposed rates will be submitted to the carriers for their approval as a substitute for the mileage rates suggested by the railroads.

With by-product coke producers seeking new markets for their output, Michigan seems to have become the important battleground for ovens in adjoining districts. Some producers, perhaps looking out for their own interests, want low rates for long hauls and high rates for short hauls. Others want high rates for long hauls and low rates for short hauls. Another proposal that will be considered is for the establishment of a separate and lower rate scale for blast furnace coke, which in some cases is shipped a considerable distance to furnaces that are under the same ownership as the coke ovens. While domestic coke is usually shipped in single car lots, furnace coke is moved in large volume, sometimes in full trainloads. For this reason it is maintained the railroads can carry this coke cheaper than domestic coke.

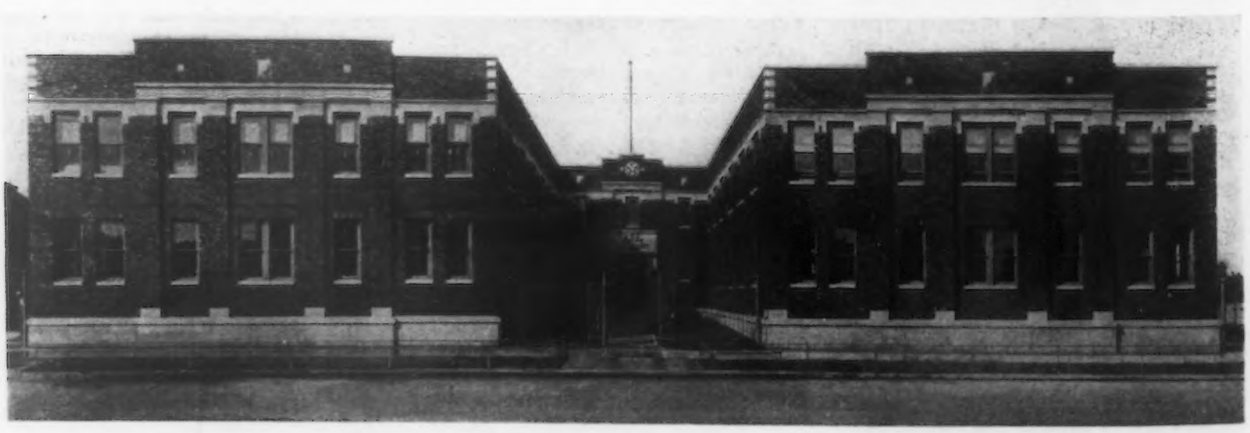
Booklet on Spiegeleisen

Feeling that the value of spiegeleisen has never been adequately stressed, the New Jersey Zinc Co., New York, has issued a booklet of 12 pages, which discusses the history, grades and uses of this alloy, as well as methods for sampling and analyzing. An interesting feature is a table giving the equivalent value of spiegeleisen and 80 per cent ferromanganese.

Details of mass manufacturing of vehicles and parts will be discussed in addresses to be given at the convention of the Production Division of the Society of Automotive Engineers to be held in Detroit Nov. 22 and 23. The annual four-day meeting of the society will take place in Detroit, Jan. 15 to 18, following the annual dinner in New York, which will be part of the society's participation in the National Automobile Show in that city.

New Testing Laboratory of American Gas Association At Cleveland

THE building, here shown, which has just been completed for the American Gas Association and which will be given over largely to the testing of gas appliances, is "dedicated to promote and develop the gas industry to the end that it may serve the best interests of the public to the fullest possible extent." The structure provides 3200 sq. ft. of office space, 8700 sq. ft. for storage and 14,700 sq. ft. for appliance testing and research. Three rooms are given over to the uses of the 200 manufacturers who make up the membership of the association.



This Issue in Brief

Demand for special steels is widespread. While much of the expanding tonnage of high-grade steels is absorbed by the automotive and railroad industries, makers of all sorts of equipment are participating in the demand.—Page 741.

* * *

Hardens transmission gears by duplex method. A combination of electric furnace and cyanide treatment is used in Dodge plant. Furnace temperature is 1485 deg. Fahr. and cyanide pot 1490 deg.—Page 762.

* * *

Finds duralumin superior to high-strength steel or wood for flying boat construction. The aluminum alloy, protected against corrosion by the anodic oxidation process, is used for bracing and for covering hull, wing floats, and engine nacelles. It is considered less liable to local injury than steel, on account of the greater thickness employed.—Page 766.

* * *

Commodity price average continues to rise. August index of Bureau of Labor Statistics was 98.9, against 98.3 in July and 95.2 in August, 1927, an advance of 3.8 per cent in one year. The average of 1926 was 100.—Page 772.

* * *

New cutting tools are said to be almost diamond-hard. Greatly increased cutting speeds claimed for new Krupp alloy. Ability to hold a cutting edge is several times greater than that of high-speed steel, maker declares.—Page 773.

Uniform machinability, toughness and soundness are gained by use of new deoxidizer in making steel, producer declares. Harmful aluminum oxide or aluminum carbide inclusions are said to be eliminated in the ladle by adding a carbon-free alloy of aluminum, silicon and iron.—Page 742.

* * *

New testing machine could pull apart a 26-in. billet of structural steel, says maker. Yet this universal testing machine, said to be the largest in existence, is so sensitive that it responds to a slight pressure of the hand.—Page 749.

* * *

Succeeds in making a twist drill which will cut high-manganese steel castings. New drill, running at 50 r.p.m., with 0.0075-in. feed, cuts nine holes through 1½-in. material with one grind.—Page 750.

* * *

For aircraft welded construction, chrome-molybdenum steel is said to be most suitable. The heated joint air-hardens on cooling and thus regains nearly all the original strength.—Page 742.

* * *

Where machinability, weldability and stiffness are needed in combination, Bessemer steel is superior to open-hearth, metallurgist declares. Possession of these three qualities gives Bessemer a preference for agricultural implement trade and similar uses.—Page 765.

* * *

Manufacturer held liable for injuries received by child trespassing on plant property. Manufacturer should have guarded premises, court rules.—Page 767.

Quenches ring gears in press. After carburizing and hardening, Dodge ring gears are quenched in oil in a press and drawn 40 min. at a temperature of 300 deg. Fahr.—Page 764.

* * *

Under effects of cold-working Bessemer steel has a tendency toward brittleness. This is accentuated when manganese content is above normal. Bessemer shapes are especially susceptible to damage in straightening.—Page 765.

* * *

Will growth of "industrial institutes" curtail straight competition? No, says editorial writer. But *blind* competition may be eliminated, for which both buyers and sellers should be thankful. Exchange of business statistics among competitors permits business to be done in the daylight.—Page 778.

* * *

Automobile production close to record. During first eight months of 1928 the total output of passenger cars and trucks was 3,051,304. Only in 1926 was this surpassed, with 3,144,466 units in eight months.—Page 772.

* * *

High machinability is produced by annealing transmission gears to obtain a microstructure of coarse lamellar pearlite, with some massive ferrite, without any sorbite or spheroidal cementite.—Page 762.

* * *

Smaller as well as larger companies are cooperating in simplification, Department of Commerce reports. Fourteen per cent of 212 producer-acceptors behind 10 simplified practice recommendations are capitalized under $100,000.—Page 774.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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Competition in Darkness or Daylight?

THE organization of industrial institutes and their effect upon competition are viewed with concern in some quarters. Thus, the New York *Journal of Commerce* writes: "This new kind of competition proves upon analysis to be the antithesis of the economist's definition, implying as it usually does some sort of agreement to combine or at least to cooperate to reduce the intensity of the competition already existing." Here the implication is that this will lead to some new kind of governmental regulation.

The "new competition" is indeed different from the old, as Arthur J. Eddy showed in his book under that title some years ago. In former times competition was haphazard and produced violent cycles, which were but imperfectly understood. In periods of strong demand producing capacity was extended, generally too much, the result being that industries became overbuilt and overmanned, with the ensuing evils of a cut-throat struggle for business, unemployment and general loss. The pendulum then would overswing the other way and upon revival of demand industries would be found to be underbilt and prices would tend to rise extravagantly.

It may be declared as a principle that an extravagant rise in prices is the premium offered for new capacity, while conversely an extravagant decline is nature's method of extinguishing an excess. During the World War this principle exhibited itself in acme. When the price for spelter rose to 25 cents per pound buyers were simply advancing the cost of building new plant, to be amortized perhaps in a year. In peace such orders are far less imperative than in war, but the theory is the same. In practice the great difficulty was that no one had any means of gaging what the market was saying. Its tenor was clear but its pitch certainly was not.

In our modern development this has been changed in that we are able to translate into numerical expressions what was formerly only vague sentiment. There is just the difference between doing business in the daylight and in the dark. There is no curtailment of straight competition. There may be an elimination of blind competition, and for that everyone should be thankful. If blind competition occasionally produces bargains for buyers and profitless activity for sellers, oppositely it leads to the strangulation of buyers and temporarily to plums for sellers. Contraction of fluctuations is so beneficial that it is welcomed by both buyers and sellers. If academic economists have any different definition of the meaning of competition or its working, they will do well to revise their dogmas.

Does the Public Know Us?

AT a recent meeting of the Lake Superior Mining Institute, held jointly with the iron and steel division of the American Institute of Mining and Metallurgical Engineers, Thomas T. Reed of the latter organization emphasized the undoubted fact that the public as a whole has no real appreciation of the importance of the iron and steel industry to our modern machine-made civilization. Engineers, constructors and manufacturers readily recognize that iron and steel are fundamental. Even though they work in wood, or silk, or sugar beets, the machinery which brings in the raw materials, which actually does the work, which finally delivers the goods at home or abroad is impossible except for ample and ready supplies of iron.

But the public generally does not stop to think that things made of iron and steel cultivate the farms, pack the foodstuffs, weave the textiles, transport all commerce, and carry all passengers. Ask a man at random, and he would probably say (thanks to publicity) that electricity is the most potent mechanical influence in his life; but he would fail to visualize the large quantities of iron, steel and copper without which electricity could not be generated or transported to his many utilities.

The same is true of steam, of coal, of transportation. Whatever aspect of everyday life one views it is machine made; in its present form it needs steel and iron in increasing amounts—but sad to say, the average man does not comprehend it.

It is important that this mutual relationship between the ordinary citizen and the iron and steel industry be brought home to him. To achieve this object would be the justification of a most determined publicity effort. The whole industry could not do better than to foster jointly such an attempt. Just now we hear much from contending politicians, vying for the farmer's vote, as to the essential nature of agriculture; how it must be fostered, how all artificial handicaps must be removed, how it may even be subsidized. While the iron and steel industry does not expect any coddling, nor does it need it, a proper appreciation of its importance would avoid some well-meaning but misdirected actions against trusts and "malefactors of great wealth." An intelligent golden-rule policy of live-and-let-live would naturally be set in operation. That such a consummation is possible is proved by the public attitude toward the telephone system, as rich and complete a monopoly as could be wished, yet well managed enough to acquire the confidence and good-will of the vast majority of the people.

Prosperity is a mutual thing. If one section of our

country suffers, or one nation in the world family, its condition affects economic life in a wide area. Contrariwise expanding wealth creates more wealth. Such facts are now becoming generally appreciated. It remains to associate with them in the popular mind a vivid realization of the necessity for a sound condition in the fundamental industries, those that underly modern civilization. Of such industries iron and steel is chief.

Why This Stock Market?

FEDERAL RESERVE banks appear to have suspended their efforts to control the stock market. At the same time, commercial banks have essayed to discourage the private lending of money on call. The rate for call money continues high. Nevertheless, the stock market pays but scant attention to any of these conditions. Indeed, there has been a renewed bull movement, with a broader participation in the stock market than ever before. The business of New York brokerage houses that emanates from their branches as far west as San Francisco and as far south as New Orleans is immense. Hence, four-million-share days.

The public has gone into the market with its own money to a greater extent than ever, buying outright or preserving large equities. Thus, it is not shaken out by breaks. The public also is showing unusual discrimination, selecting those securities that give good promise, for economic reasons, of increase in value. Hence, it is disregardful of low immediate dividend yield.

The man who is convinced that the mail order houses, for example, are going to do increased business and to earn greater profits because they are working a major economy in retail merchandising is not deterred by any figuring that their present dividend to himself as a stockholder will be only 3 per cent. And if he is investing his own money he will be quite indifferent to a call rate of 8 per cent.

The same man will not touch the stocks of textile manufacturing companies with a ten-foot pole, for they offer nothing appealing to his imagination.

When we say "the public," we mean the composite judgment of the investors and business men of the country, and it may be sounder than that of academic experts. The present speculative era does not look at this stage like one that involves the flyers of milliners, actresses and small tradesmen. It is more an expression of confidence in the growth of the country and a study of the new things which promise profits in producing goods and services that are wanted by an increasing population.

At the same time it is not exempt from liability to the excesses which have brought unpleasant reckonings on other occasions. Even the best reasoned upward movements, with all the resources and brains that have been behind them, have attracted an unthinking but highly impressionable following which eventually proves their undoing.

AUTOMOBILE and motor truck exports from the United States have grown this year to an extent quite justifying the industry's assiduous cultivation of foreign fields. To Aug. 1, 233,200 passenger cars had been sent abroad, an increase of about 30 per cent over the 179,100 cars exported in the like period of 1927. There has been a 12 per cent increase this year in exports of motor trucks—71,700 against 63,900 last year for the seven months. A continuance of passenger car exports at the rate of the first seven months would give a year's total around 400,000, which is somewhat more than the largest month's output the industry has had. Similarly, a continuance of the seven months' average of motor truck exports would mean that about 25 per cent of the year's output had gone abroad. At such proportions, this branch of our export trade means much to the steel and foundry industries, accounting for no small part of the year's increased demand for sheet and bar steel, alloy steel and forgings, as well as copper, tin and other metals.

Steel Consuming Records

AS the time of the presidential election approaches the tonnage of steel is making a still more favorable showing. In this department of THE IRON AGE of June 21, under the caption "An Active Presidential Year," it was pointed out that half the year was virtually ended and had "made a very fair showing" in trade generally. Now we are less than one-third as far away from the election and the showing is still better.

Three items as to steel consumption are of particular interest in this connection. Fabricated structural steel lettings as reported for August at 356,250 net tons made a new high record for any month, and shipments at 300,000 net tons also made a new high record for any month. Production of automobiles and trucks in the United States, reported at 458,429 for August, also made a new high record for any month. Production of the agricultural implement industry in this year as a whole is making a new high record, by a substantial margin.

Now and then it is said there are those who argue that members of one of the political parties have a desire in presidential years to manufacture prosperity for its influence upon the election. That might be theoretically applicable to fabricated structural steel, but it fails utterly as to automobiles and agricultural implements. Members of both parties buy automobiles and the farmers are not known to have indulged in any concerted action to influence the election by buying farm implements. Their campaign activities follow a much less expensive course.

Barring a totally unexpected slump, steel ingot production this year, as we have pointed out, will make a new calendar year record, and it is no small thing in these post-war years for it to do this. In eight of the 15 pre-war years steel ingot production made a new high record, but six years elapsed after the war before the 1917 record was passed, 1925 accomplishing the feat. Then 1926 made another record, but 1927 fell below both those years.

Production in this year to Sept. 1 was above 1926 by nearly 4 per cent, and it is significant that July and August gained more over 1926 than did the first six months. One might venture to expect that the remaining months of this year will bring larger gains than 4 per cent over the same months of 1926, particularly as that year showed sharp declines in November and December from the October rate, while merely a 4 per

cent gain for the whole year seems a conservative guess. That would make 49,000,000 tons of ingots for the year, against 43,776,717 tons last year, 46,936,205 tons, the previous record, in 1926, 40,881,392 tons in the apparently boom year of 1920, and about 30,280,000 tons in both 1913 and 1912.

The reference is wholly to what is commonly called "steel," measured by the steel ingot. Steel castings have not been doing particularly well. Rolled iron had dropped from 1,678,257 tons in 1913 to 544,344 tons last year. Iron castings have had little growth in the last 15 years or more. Some of the gain in steel has been at the expense of other ferrous products. There are, however, gains in the total of all ferrous products. It is a detail that on account of increasing supplies of scrap the gains in pig iron are smaller. Pig iron made a new record in 1923, and this year will run 20 to 25 per cent above the mean of 1912 and 1913.

Quantity Discounts on Steel

QUITE a while ago the suggestion was made that steel mills might well arrange quantity discounts on some of their products, merchant bars being particularly mentioned. Nothing came of the suggestion, but the success mills have had in the last year with various changes in sales terms indicates that the possibility of making this one has greatly increased. The wire mills established a new and better proportioned card of size extras on nails; the bar mills adopted lump sum extras for small quantities of a size; the sheet and cold rolled strip mills are revising their cash discount, and in various other ways sales practice has been changed.

The essence of the proposed quantity discount is that it relates the price received to the actual cost of production. It would be made in accordance with the quantity of one section (and one analysis or quality) specified for shipment at one time. A mill cost is reduced when there is a run of a given length. Sometimes mills can make the saving by combining specifications, sometimes they can not. Frequently the customer could arrange a larger specification if it were to his advantage. Many customers now furnish such runs but do not obtain an advantage by doing so.

Some mills have definitely expressed a desire to get away from the idea that the total purchases in a year should influence the price. The majority of their customers, in point of number, heartily agree with this view. The customer desires to be on even terms with his competitor, and the smaller buyer naturally asks the mill how he is expected to grow if his larger competitor secures cheaper raw material. With the proposed system, the smaller buyer would specify less frequently, thus accumulating sufficient demand for a given size to obtain the quantity discount.

Some efforts to realine prices have failed, probably because they merely named an invariable quantity, irrespective of size, requisite to command the discount. In merchant bars, to illustrate, there should be one tonnage in case of half-inch rounds and a much larger tonnage in case of four-inch rounds, to command the discount. A carload of half-inch rounds makes quite an order for a mill; a carload of four-inch rounds is relatively a small thing.

Inasmuch as there is already an extensive card of extras on bars, according to section and size, it would not be hard to introduce an additional column or columns to indicate the amount to be specified for shipment at one time in order to command a quantity discount. These figures would be determined by a study of mill costs. The saving in cost would be shared between the producer and the customer.

Such a system would help the trade get away from the condition of there being different bases for invoice prices at a given time according to the class of trade, something that has always been difficult to handle. In the old days, when market prices had the way of advancing by successive stages, the matter of preference was handled in large part by giving the preferred buyers contracts farther ahead. The system was crude but it seemed to work rather well. Conditions are different now, as forward business is no longer done to the same extent, and new practice is needed to cover the point that production costs vary according to the length of the run on a given size and section.

CORRESPONDENCE

Dwight and Lloyd-Greenawalt Patent Litigation

To the Editor: In your issue of Sept. 13, page 674, is a statement purporting to be an account of the litigation between the Dwight & Lloyd Sintering Co. and myself. I consider this statement not only very unfair to me, but also unfair to your numerous readers who have been vitally interested in this litigation. Therefore I am inclosing you a copy of the decision handed down by the Court of Appeals of this circuit, and also a copy of Judge Thacher's decision in the District Court.

The heading of your article is misleading, and you will notice that there is no truth whatever in the statement that Dwight and Lloyd are "recognized as the inventors of this contribution to the art and its importance acknowledged." The court did say that the Dwight and Lloyd apparatus went into extensive use, which is not denied by anyone.

Originally nine patents were involved, and the suit with reference to all of these was dismissed by Judge Thacher. No appeal was taken on two of the nine patents, leaving seven patents that were appealed. The basic Dwight and Lloyd patent was disposed of by the court on the basis of laches, so it was not necessary for the court to go into the question of infringement, the decision maintaining that "To allow them to hold in reserve this patent appears to us to invite just those delays which are so oppressive an incident to patent suits. If we are to recognize such an excuse, we weave one more thread in the mesh which entangles those who must pass through their mazes." Judge D. J. Thacher, in the original decision, said that "Assuming infringement, I am entirely satisfied that Greenawalt honestly believed he was not infringing. This belief was confirmed and encouraged by the plaintiff's acquiescence, with full knowledge and without objection, in all that he did."

The sintering pan patent is disposed of on the basis that it is invalid if infringed. The invalidity is based upon the Eldred patent, No. 885,328.

Two of the claims of the so-called "iron patent" are held invalid because "The process apparently appears to us completely anticipated by Heberlein's patent, No. 844,355. . . .

The merit of the invention (Dwight's) is its avoidance of silicates; it does not appear that merely to use the carbonaceous material when the ores did not contain their own combustible proved a great step in the art."

The other two claims of the iron patent were held invalid if infringed, the court holding that the matter so introduced was a new invention, also that "the delay was for over two years after Greenawalt's plant was in operation, and if his process involves temperature control at all, a disputed question, the amendment was too late."

Ignition claims in two of the Dwight patents are held invalid for the reason that the invention "was new matter which he was no longer entitled to claim since Greenawalt had already more than two years earlier been using such a process to set fire to the ore." The claims of the other ignition patent are held invalid because an application was renewed more than two years after the original application had been allowed.

You will notice that this is a sweeping decision in my favor, and that Dwight and Lloyd did not succeed in a single one of the numerous claims sued upon, and that four of the patents were invalidated and two more practically so.

JOHN E. GREENAWALT.

New York, Sept. 20.

[The title of the article of Sept. 13, to which Mr. Greenawalt takes exception, was "Dwight and Lloyd Patent Decision Affirmed." It did not say, as Mr. Greenawalt seems to imply, that the Dwight and Lloyd claims were sustained. The Court of Appeals did affirm the decision of the United States District Court, as is stated in the first sentence of the article, and that was practically all that with safety could be put into a headline, so complicated was the litigation and so hedged and qualified were various findings of the court.—EDITOR THE IRON AGE.]

Michigan College Studies Copper and Iron Ores

In 1927 the State Legislature appropriated to the Michigan College of Mining & Technology, Houghton, Mich., the sum of $50,000 per year for two years, for research on iron and copper. The Governor found it necessary, despite his strong approval of the work, to cut the first year's appropriation to $25,000, and this sum became available July 1, 1927. On June 27, 1928, the college was able to announce that the copper mining research, in cooperation with the United States Bureau of Mines, had demonstrated that the copper loss in the amygdaloid tailings could be reduced from 4½ lb. per ton to about 1½ lb. Dr. W. O. Hotchkiss, president, in an address before the Lake Superior Mining Institute, Sept. 7, said that these new findings will not only result in marked savings in present operations, but will enable many deposits formerly considered worthless to be opened or reworked.

A study of the possibility of removing sulphur from some of the high sulphur iron ores has been carried on for two years—first with funds supplied by mining companies and later with college research funds. While interesting scientific results have been obtained, nothing has yet been discovered that leads the investigators to hope for the solution of the economic problem.

The largest problem, and one which in Dr. Hotchkiss' opinion is a long and arduous one, is the problem of "manufacturing" iron ore from low grade deposits not of present economic value.

Type Metal Contracts During Solidification

Contrary to the general belief that type metal alloys expand during solidification, a research by Y. Matayama (directed by Professor K. Honda) indicates that a small contraction actually occurs during freezing, although less in amount than in many other metals. Good impressions are made in modern type machines more because a certain pressure is applied to the molten metal in the mold. Furthermore the surface tension of the type metal alloys is small, this being responsible for good fluidity and ready flow into finely engraved depressions in the mold. The alloys used at present are also cheap and of low melting point; an improved metal must have these present characteristics and expansion during solidification as well.

A thermobalance was used to determine density at changing temperature. Results as published in *Science Reports*, Tohoku Imperial University, January, 1928, as shown in the accompanying table.

Alloy	Composition		Melting Point	Contraction During Solidification
Pure lead	.....	.....	.....	3.4 per cent
Pure tin	.....	.....	.....	2.8 per cent
Pure bismuth	.....	.....	.....	Expands 3.3 per cent
Pure antimony	.....	.....	.....	Expands 0.95 per cent
Lead-antimony	Pb:Sb	85:15	.....	2.39 per cent
Monotype metal	Pb:Sb:Sn	76:16:8	.....	2.06 per cent
Linotype metal	Pb:Sb:Sn	79:16:5	248 deg. C.	2.06 per cent
Stereotype metal	Pb:Sb:Sn:Cu	83.75:11.75:4:0.5	244 deg. C.	2.04 per cent
Electrotype metal	Pb:Sb:Sn	92:4:4	230 to 285 deg. C.	2.61 per cent
Superior type metal	Pb:Sb:Sn	50:25:25	240 to 307 deg. C.	1.24 per cent
Commercial type metal	.....	.....	.....	2.35 per cent
Tin-Zinc	Sn:Zn	90:10	.....	2.64 per cent

Mullite and Other Special Refractories

The possibilities resulting from the use of the sillimanite group of minerals, including cyanite and andalusite, for refractories has been a live subject in recent years. The physical and chemical properties of these materials are of a most promising nature. Their proper use in brick-making has, however, required careful study and the full merit of the present products has not been established in many types of service. Their field will broaden in the future, filling the positions that cannot be satisfactorily met by other materials. The comparative cost of the raw materials will necessarily limit their use and place them in the class of specialties, in the opinion of Stuart M. Phelps expressed in Technical Bulletin No. 21, American Refractories Institute.

A noteworthy refractory material of this class is the cast mullite. This product, which is simply a casting from an electric furnace melt, is of considerable interest. Raw materials of the composition necessary to produce mullite are used for the melt and after being cast the shapes are annealed. The finished product has almost no pore spaces and is, therefore, specially resistant to slag action. It has been found that the addition of low percentages of certain materials will substantially alter the properties of the finished casting, especially with regard to slag action. It is logical to expect that this principle will be applied to the manufacture of refractories of other compositions. Chrome, magnesite and spinel compositions made in this way should prove to be of value to the steel industry.

In recent years a highly calcined kaolin refractory has been marketed and like other special materials it is becoming established in certain limited uses. This product, by reason of the purity of the clay used in manufacturing and the exceedingly high temperature to which it is fired, possesses some unusual properties for clay refractories.

Iron and Steel Markets

Rail Buying Movement Begins

Over 150,000 Tons of Rails Bought—Volume of Steel Business and Pressure for Deliveries Stiffen Price Situation

EXPANDING demands from the railroads, together with unabated pressure for material by the automobile industry, are strengthening the position of steel producers.

The inflow of business in the last month of this quarter has proved more than enough to sustain a high rate of output—it has resulted in a gain. The operations of Steel Corporation plants now average 85 per cent of ingot capacity, compared with 75 per cent a month ago. The rate of a leading independent is 86 per cent. Among the producing districts, Chicago, Pittsburgh and Youngstown alike have increased production, in each case reaching an average of close to 85 per cent.

Mill backlogs, after being built up by liberal specifications against expiring contracts, have been reinforced by orders for 155,500 tons of rails, mostly for winter rolling. Of this total the Louisville & Nashville bought 50,000 tons, the Chesapeake & Ohio 45,500 tons, the Union Pacific 40,000 tons and the Great Northern 15,000 tons. The New York Central and the Pennsylvania are expected to enter the market shortly for 200,000 tons each.

With the launching of the customary fall rail buying movement come more insistent reports that the railroads will soon make liberal purchases of rolling stock.

The large volume of business on the books and still coming, in some cases with increased emphasis on prompt shipment, has stiffened the mills' attitude on prices. The failure of producers to fix a uniform deadline for shipping orders against third quarter contracts for bars, plates, shapes and sheets caused confusion, which they hope to prevent three months hence by general adherence to Dec. 15 as the last day for specifications.

Now that specifying is drawing to a close for those mills that are accepting releases until the end of September, price uncertainty appears to be passing. While many buyers are not yet showing an interest in forward commitments, the number of fourth-quarter contracts so far closed is larger than expected.

At least one large user of bars succeeded in covering at 1.85c., Pittsburgh, but a preponderant number of contracts for bars, plates and shapes closed to date have brought 1.90c. to 2c., a full advance of $2 a ton over third quarter figures.

Specifying was heaviest in sheets, and some buyers are covered for fully 60 days; yet the price advances asked for fourth quarter are apparently not impeding contracting.

With some consumers, particularly the automobile industry, prices have become secondary to deliveries. The motor car makers, after setting a new monthly record for production in August, are taking more steel than ever before at this season and expect to maintain present operations through October. Mills face a pressure for shipments indicating that much of the steel now being rolled is passing directly into consumption. In certain instances buyers are dividing orders among several producers to insure deliveries when wanted.

The improved tone of prices of finished steel has extended to semi-finished material, and it now seems probable that fourth quarter contracts will carry advances of $1 a ton on sheet bars and $1 to $2 a ton on billets and slabs.

A decline in inquiry for fabricated steel and backwardness of pending projects, reported from some market centers, has caused mills to extend protections on plain material and has raised doubts regarding the trend of construction activity.

In pig iron, the fourth quarter buying movement is largely over, although sales by Cleveland producers totaled 35,000 tons for the week. Fortified by liberal bookings, furnaces are holding firmly to recent price advances. Blast furnace stocks are being reduced, and, if demand holds at the present rate through the coming quarter, producers that had large accumulations early this year will have little stock iron left. Shipping orders from the automotive industry indicate that it will take as much iron next month as in September.

Scrap prices, although as a rule no longer rising, remain strong.

British makers of ferromanganese, according to our London cable, have raised prices $5 a ton, to $110, American seaboard, duty paid.

Copper advanced another ¼c. a lb. to 15.25c., delivered Connecticut Valley, on Sept. 24. Sales for the month establish a new recent record at over 200,000 net tons, of which 70,000 tons is for export.

THE IRON AGE composite price for pig iron has advanced for the third consecutive week, now standing at $17.71 a gross ton, within 4c. of the highest level to date this year, reached in February. The finished steel composite remains unchanged for the eighth week at 2.348c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Sep.25, 1928	Sep.18, 1928	Aug.28, 1928	Sep.27, 1927
No. 2, fdy., Philadelphia	$20.76	$20.76	$20.26	$20.26
No. 2, Valley furnace	17.00	17.00	16.50	17.50
No. 2, Southern, Cin'ti	19.94	19.94	19.94	20.94
No. 2, Birmingham	16.25	16.25	16.25	17.25
No. 2 foundry, Chicago*	18.50	18.50	18.00	19.50
Basic, del'd eastern Pa	19.00	19.00	19.00	20.00
Basic, Valley furnace	16.25	16.25	16.00	17.00
Valley Bessemer, del'd P'gh	19.01	19.01	18.76	19.76
Malleable, Chicago	18.50	18.50	18.00	19.50
Malleable, Valley	17.25	17.25	17.00	17.50
Gray forge, Pittsburgh	18.26	18.26	18.01	18.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	90.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh	32.00	32.00	32.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	39.00
O.-h. billets, Phila	37 30	37.30	37.30	38 30
Wire rods, Pittsburgh	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb	1.90	1.90	1.90	1.75
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.07
Iron bars, Chicago	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh	1.90	1.90	1.90	1.75
Steel bars, Chicago	2.00	2.00	2.00	1.90
Steel bars, New York	2.24	2.24	2.24	2.09
Tank plates, Pittsburgh	1.90	1.90	1.90	1.75
Tank plates, Chicago	2.00	2.00	2.00	1.90
Tank plates, New York	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh	1.90	1.90	1.90	1.75
Beams, Chicago	2.00	2.00	2.00	1.90
Beams, New York	2.14½	2.14½	2.14½	2.09
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire,	Sep.25, 1928	Sep.18, 1928	Aug.28, 1928	Sep.27, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.65	2.65	2.65	3.00
Sheets, black, No. 24, Chicago dist. mill	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, P'gh	3.40	3.40	3.40	3.85
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, P'gh	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago dist. mill	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh	3.20	3.20	3.20	3.25
Barbed wire, galv., Chicago dist. mill	3.25	3.25	3.25	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$16.75	$16.75	$16.00	$15.50
Heavy melting steel, Phila	15.50	15.50	13.00	14.00
Heavy melting steel, Ch'go	13.00	13.00	12.75	12.25
Carwheels, Chicago	13.50	13.50	12.75	13.75
Carwheels, Philadelphia	16.50	16.00	15.50	15.50
No. 1 cast, Pittsburgh	15.00	15.00	14.75	15.00
No. 1 cast, Philadelphia	17.00	16.50	15.50	16.50
No. 1 cast, Chicago (net ton)	15.00	15.00	14.25	14.50
No. 1 RR. wrot., Philadelphia	15.50	15.00	13.50	15.50
No. 1 RR. wrot., Chicago (net)	12.00	12.00	11.25	11.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.85
Foundry coke, prompt	3.75	3.75	3.75	4.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	15.25	15.00	14.75	13.25
Electrolytic copper, refinery	15.00	14.75	14.50	12.30
Zinc, St. Louis	6.25	6.25	6.25	6.20
Zinc, New York	6.60	6.60	6.60	6.55
Lead, St. Louis	6.32½	6.32½	6.22½	6.00
Lead, New York	6.50	6.50	6.40	6.25
Tin (Straits), New York	48.62½	48.00	47.50	58.75
Antimony (Asiatic), N. Y.	11.00	10.87½	10.25	10.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Orders and Specifications Exceeding Those of Last Month—High October Production Assured

PITTSBURGH, Sept. 25.—The steel market continues to disprove the theory that the exceptional summer activity was at the expense of fall business. In all finished products except wire products and tin plate, which usually are quiet at this time of the year, the report uniformly still is of maintained demand, with tonnage releases generally exceeding those of August.

In some cases the delivery promises of mills are not sufficiently prompt to bring them the orders. A buyer of bars seeking 100 tons of a size found it necessary to split the order between makers to insure delivery when wanted. The demand, particularly from the motor car builders or those serving them, is featured by its urgency. Steel consuming industries are normally busy for the time of year, and close observance of purchasing in strict accord with real needs has prevented any building of stocks.

Additional business stimulant is found in the continued effort of steel manufacturers to secure higher prices, to which was coupled the setting of a time limit as to acceptance of specifications on contracts. Although full success has not attended these efforts, the desire for better returns has not abated. Because a lack of uniformity as to the limiting date on third quarter contracts is held to be responsible for the failure of mills to gain their price objective, it is noted that they are setting Dec. 10 or 15 as the deadline on specifications on fourth quarter contracts.

It is becoming apparent that steel manufacturers will have to be satisfied with a lower minimum than 2c., base, on fourth quarter bar, plate and shape business. Sheet makers are getting a good many fourth quarter contracts at the prices they named several weeks ago, but they also have much business taken at lower prices that will be an obligation against fourth quarter production. The average prices on fourth quarter strips will not be materially higher than those of the second and third quarters of this year. An advance of $1 to $2 a ton in prices, plus the charges contained in the new card of chemical extras, is proposed on billets, slabs and sheet bars for shipment in the final quarter.

If there is a definite tendency to steel plant operations, it is upward, notably in the Youngstown district, which is feeling the full effect of heavy demand from the automotive industry and a good demand for seamless oil country pipe and for line pipe. The general average of ingot production is close to 85 per cent of capacity, with the independent companies doing somewhat better than the Steel Corporation plants. September production will show up strongly in comparison with either of the two preceding months, and there is promise of a good October from the momentum of this month, even should there be some abatement, as is expected, in automobile industry demands and a falling off in structural lettings.

Pig iron is not doing enough to provide a real test of the higher prices, which makers recently announced.

The advance in scrap has stopped with a decline of mill buying and the fact that the demand now is chiefly from dealers, who recently went short and who are naming prices calculated to net them a profit on their sales.

Pig Iron.—A moderate amount of business is being done in foundry iron and in all cases at the full quotation of $17, Valley furnace, for the base grade. In other directions sales are few and small and provide no real test of prices. It is said that there is no basic iron to be had at less than $16.50, Valley furnace, and one of the steel companies which ordinarily has some of this grade for sale has let it be known that it does not expect to have any for market during the remainder of the year on account of the size of its finished steel orders. However, no sales of this grade have yet been reported at more than $16.25 and it is not easy to get users to bid even that price, as they are well covered and at the moment would be interested in additional supplies only as a speculation. The quotation of $17 for basic iron may be interpreted merely as an announcement that those naming the price are out of the market. The actual price will probably be established when a steel foundry seeking 2000 tons for December shipment closes. No important sales of Bessemer and malleable iron are reported. The Republic Iron & Steel Co. is starting up its one idle Haselton stack to maintain pig iron production lost through the shutting down of the Trumbull-Cliffs furnace at Warren, Ohio. The Claire furnace, Reliance Coke & Furnace Co., Sharpsville, Pa., which it was said some time ago would be blown out Nov. 1 will probably be kept in blast to the end of the year or later.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$16.25 to $17.00
Bessemer	17.25 to 17.50
Gray forge	16.50
No. 2 foundry	17.00
No. 3 foundry	16.50
Malleable	17.25 to 17.50
Low phos., copper free	26.50

Freight rate to Pittsburgh or Cleveland district, $1.76.

Hot-Rolled Flats.—Strip business is maintaining a surprisingly high rate, with all makers in this area reporting tonnage releases to be well in excess of those of last month. This activity reflects the unusually high rate of motor car production. Reports that automobile manufacturers are figuring on as big a production in October as in this month are credited, but there is some doubt whether the orders for steel will hold up correspondingly. While the Ford Motor Co. is steadily expanding production, the maker of another low-priced car is winding up production of the present model and is yet to release much steel on the new model to come out about Nov. 1. Strip prices are steady at substantially the levels which ruled during the past two quarters. Prices also hold well on hoops and bands, in which business is fairly active.

Cold-Rolled Strips.—Business is active and prices are firm at 2.75c. to 2.85c., base, according to the size of buyer's requirements. These are practically the prices that have ruled during the past five months. It is said that sales at 2.65c., base, during that period were few and were for especially attractive tonnages.

Coke and Coal.—Cool weather is stimulating the demand for coal and coke for heating purposes. While heating coke is available at as low as $2.50 and commonly is selling at $2.65, some buyers prefer standard furnace grade at a higher figure. This demand, plus the fill-in demand from pig iron producers, is keeping the market well cleaned up of spot supplies of furnace coke, and prices are firm. The demand for spot foundry coke is more active. Prices, though no higher, are firm. The coal market, particularly for slack grade, is still weak. Even in domestic sizes, for which demand is good, prices are kept down by abundant supplies.

Semi-Finished Steel.—Fourth quarter prices on billets, slabs and sheet bars are beginning to crystalize, and while all makers have not yet announced the new quotations, it is probable that the market will be established at $33 for sheet bars, $34 for 4 x 4-in. billets, or equivalent area of slabs, and $35 for small billets and slabs, with the size and chemical extras announced more than a month ago to apply. These prices represent an advance of $1 a ton on sheet bars and from $1 to $2 a ton on billets and slabs over the third quarter contract prices. For that period the price of sheet bars was generally $32, while on billets and slabs there were contracts carrying both $32 and $33. Incidentally, the new price setup reverses the former order in which sheet bars commanded a premium of $1 a ton over billets. The base price of forging quality steel is still a little indefinite; some producers have renewed present arrangements carrying a base price of $38 for the final quarter of the year, while others now quoting $34, base, for billets are maintaining the former extra of $5 a ton for forging quality, and one important producer has announced a base price of $40. Non-integrated manufacturers are taking out steel freely on third quarter contracts and some of the strip makers are said to have sizable stocks of billets and slabs. The decline in billets, slabs and sheet bars in the third quarter was directly associated with heavy melting steel scrap at $14 and basic pig iron at $15.25; in the past month or so, heavy melting steel has advanced to $17 and basic iron has actually sold $1 a ton above its low point and now is held at $17, Valley furnace. The higher prices on semi-finished steel also have a connection with the higher prices that are being sought for several of the finished products, since with higher raw material costs, those who buy their steel would be expected to take a firmer stand on the finished lines. Wire rods are steady at $42, base Pittsburgh and Cleveland, for either prompt or fourth quarter shipment.

Bars, Plates and Shapes.—There continues to be heavy specifying against expiring third quarter contracts, and manufacturers are growing more confident of their ability to obtain some advance over third quarter contract prices on business for the final quarter of the year. The eagerness of buyers to get in specifications, which has made the past week an-

The Iron Age Composite Prices

Finished Steel

Sept. 25, 1928, 2.348c. a Lb.

One week ago	2.348c.
One month ago	2.348c.
One year ago	2.346c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Sept. 25, 1928, $17.71 a Gross Ton

One week ago	$17.63
One month ago	17.34
One year ago	18.09
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	1.95c. to 2.09c.
F.o.b. Cleveland	1.90c. to 2.05c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60 ft. lengths	1.90c. to 2.00c.
F.o.b. Pittsburgh mills, cut lengths	2.15c. to 2.25c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.	1.75c. to 1.85c.
F.o.b. Chicago Heights mill	1.85c. to 1.95c.

Iron

Common iron f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c. to 2.00c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.20c. to 2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Bethlehem	2.00c. to 2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.01c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh	1.85c. to 2.00c.
6 in. and wider, P'gh	*1.75c. to 1.90c.
Narrower than 3 in., Chicago	2.30c.
From 3 to 6 in., Chicago	2.20c.
6 in. and wider, Chicago	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carload per 45-lb. bundle	$1.27
2000 bundle lots	1.25
Larger lots	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c. to 2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.15c. to 2.25c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, Pittsburgh	4.25c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	3.20
Barbed wire, painted	2.95

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist.	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.65c. to 2.75c.
No. 24, f.o.b. Chicago dist. mill	2.75c. to 2.85c.
No. 24, del'd Cleveland	2.84c. to 2.94c.
No. 24, del'd Philadelphia	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.40c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24. 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. $11.20	25-lb. coating I.C. $16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.75c.

S.A.E. Series Numbers		Alloy Differential	Net Price 100 Lb. Bars
2000	(½% Nickel)	$0.25	$3.00
2100	(1½% Nickel)	0.55	3.30
2300	(3½% Nickel)	1.50	4.25
2500	(5% Nickel)	2.25	5.00
3100	Nickel Chromium	0.55	3.30
3200	Nickel Chromium	1.35	4.10
3300	Nickel Chromium	3.80	6.55
3400	Nickel Chromium	3.20	5.95
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.25
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.45
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.80
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.10
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.20
5100	Chromium Spring Steel	0.20	2.95
6100	Chromium Vanadium Bars	1.20	3.95
6100	Chromium Vanadium Spring Steel	0.95	3.70
9250	Silicon Manganese Spring Steel	0.25	3.00
	Chromium Nickel Vanadium	1.50	4.25
	Carbon Vanadium	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 Lb.
Spikes, ⅜ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	42½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel		Charcoal Iron
Under 5000 lb.	4 Fives	1 Ten
5000 lb. to 12,000 lb.	5 Fives	2 Tens
12,000 lb. to 21,000 lb.	6 Fives	2 Tens & 2½
21,000 lb. and over	7 Fives	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	45
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Less carload, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

other big one for Pittsburgh district mills, is taken to mean that buyers expect to pay higher prices in the fourth quarter. Since all manufacturers did not insert a limiting clause as to when third quarter contract specifications must be in—and all deliveries against these contracts cannot be completed until after the turn of the fourth quarter—the actual prices for the final period are not yet clearly defined. Against reports that one large user of bars has been covered for the next quarter at under 1.90c., base Pittsburgh, are those that many larger users are signing up at 1.90c. and that the smaller consumers are contracting at 1.95c. and also at 2c. The price paid by individual buyers on third quarter contracts seems to govern the price they will be called upon to pay, not only for bars, but plates and shapes; a $2 a ton advance is being sought.

Wire Products.—Nails still are slow, but there is a fairly good demand for most of the other wire products. Prices are steady here and are reported to be holding well in other markets.

Tubular Goods.—Seamless oil country pipe and oil and gas line pipe still are the bright spots in the tubular division of the market. While no additional pipe lines of size have lately been placed, most makers are well supplied with orders, and in seamless casing and drill pipe the demand still is strong, notably from southern California. Pipe for building construction and heating is only moderately active and lapwelded pipe for oil country consumption is very dull. Good demand still is noted for mechanical tubes from the motor car builders, but boiler tube business could be better.

Sheets.—There is no letdown in business or mill operations. The American Sheet & Tin Plate Co. last week operated at 90 per cent of capacity and the general average of independent producers was not far from that mark. While the lower rate of discount to be allowed for cash in 10 days on and after Oct. 1 still is being objected to by jobbers and one of the larger motor car companies, the change is being accepted in other directions. It is also observed that the higher prices asked for fourth quarter on black, galvanized and blue annealed sheets are not impeding contracting for that period. Most buyers will enter the final quarter with lower-priced sheets due them, but those who have occasion to come into the market will doubtless find quotations firm at 2.75c., base, for black, 3.50c., base, for galvanized, and 2c., base, for blue annealed. There is still an urgency about shipping instructions that is taken to mean an absence of speculation in the present demand, and reports from the consuming industries generally are that they are normally busy for this time of the year, while the motor car industry is taking more tonnage than ever before at this season. That industry now is figuring on maintaining its present gait through next month.

Tin Plate.—Business and mill operations are tapering, as usual at this time of the year, but none of the makers expect that the dip this year will be severe, as the demand for general line tin plate is good and export business lately has been improving.

Cold-Finished Steel Bars and Shafting.—There is some resistance to 2.20c., base Pittsburgh, on fourth quarter contracts, but consumers generally are signing up at that figure. Specifications on third quarter contracts, meanwhile, remain heavy and evidence is lacking that the tonnages released are for other than immediate consumption.

Rails and Track Supplies.—The Pennsylvania Railroad is taking bids until Sept. 27 for 2500 tons of tie plates and 875 tons of spikes. The Chesapeake & Ohio Railroad has followed its recent spike award to a southern Ohio mill with another inquiry for 3000 kegs. In a prospective way, the market for track supplies is active, but current business is light. Light-section rails are slow, but standard-section rail requirements for 1929 are expected to begin reaching the market in the next week or 10 days.

Old Material.—The market has stopped advancing and its tone is a shade easier. Consumers who needed supplies are covered as a result of recent purchases and the only buyers are the dealers who took the orders. They are bidding $16.50 to $16.75 for heavy melting steel, and with no mill buying and one melter holding up shipments, they are getting fair-sized tonnages. But there are no offerings of railroad steel under $17. The pressure for deliveries of scrap, which accompanied the August upturn in steel works operation and started the scramble among dealers to cover short sales at advancing prices, has subsided materially. There is still a sizable short interest in steel works scrap, but whether this means still higher prices depends on whether there is another bulge in steel ingot production. There is usually a short interest in this grade, and it becomes acute when steel production is to be increased and there is a demand for deliveries from several consumers at the same time. Machine shop turnings are slightly easier, with $11.75 now the top of the market, and on the blast furnace grades $12.50 appears to be all that is obtainable, as against $13, the recent top.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:		
Heavy melting steel	$16.50 to	$17.00
Scrap rails	16.00 to	16.50
Compressed sheet steel		16.50
Bundled sheets, sides and ends	15.00 to	15.50
Cast iron carwheels	15.00 to	15.50
Sheet bar crops, ordinary	16.75 to	17.25
Heavy breakable cast	12.75 to	13.25
No. 2 railroad wrought	16.50 to	17.00
Heavy steel axle turnings	14.50 to	15.00
Machine shop turnings	11.50 to	11.75
Acid Open-Hearth Grades:		
Railr. knuckles and couplers	17.50 to	18.00
Railr. coil and leaf springs	17.50 to	18.00
Rolled steel wheels	17.50 to	18.00
Low phos. billet and bloom ends	20.00 to	20.50
Low phos., mill plates	18.50 to	19.00
Low phos., light grade	17.50 to	18 00
Low phos., sheet bar crops	18.50 to	19.00
Hvy. steel axle turnings	14.50 to	15.00
Electric Furnace Grades:		
Low phos. punchings	17.50 to	18.00
Hvy. steel axle turnings	14.50 to	15.00
Blast Furrace Grades:		
Short shoveling steel turnings		12.50
Short mixed borings and turnings		12.50
Cast iron borings		12.50
No. 2 busheling	11.00 to	11.50
Rolling Mill Grades:		
Steel car axles	18.50 to	19.50
No. 1 railroad wrought	12.50 to	13.00
Sheet bar crops	17.50 to	18.00
Cupola Grades:		
No. 1 cast	15.00 to	15.50
Rails 3 ft. and under	16.50 to	17.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.30c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

To Aid Industry in Securing Census Statistics

The American Management Association, 20 Vesey Street, New York, has appointed a committee to cooperate with the Government in planning the collection of official statistics on marketing and distribution with special reference to the 1930 census. H. A. Richmond, director marketing and distribution, Policyholders Service Bureau, Metropolitan Life Insurance Co., New York, is chairman of the committee. Companies or persons wishing the Government to gather certain statistics in connection with the 1930 census are requested to get in touch with the chairman and present suggestions.

The Oliver Iron & Steel Corporation, Morris & Bailey Division, Pittsburgh, announces the appointment of Edgar T. Ward's Sons Co., Pittsburgh, as its mill representative and warehouse distribuer of cold-rolled strip steel in Indiana, Illinois, western Michigan, Wisconsin and Missouri.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$32.00 to $34.00
Rerolling, under 4-in. to and including 1¾-in.	33.00 to 35.00
Forging, ordinary	38.00 to 40.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$32.00 to $33.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$32.00 to $34.00
Smaller than 8 in. x 2 in.	33.00 to 35.00

Skelp

	Per Lb.
Grooved	1.85c. to 2.00c.
Sheared	1.85c. to 2.00c.
Universal	1.85c. to 2.00c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00
Screw stock	$5.00 per ton over base

*Chicago mill base is $43. Cleveland mill base, $42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	*Per Unit*
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	38c.
Manganese ore, Brazilian, African or Indian, basic 50%	37c. to 38c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.90 to $11.25
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75
Foundry, f.o.b. Connellsville prompt	$3.50 to 4.25
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$33.00
Domestic, 16 to 19%	32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	95c. to 98c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium, fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$17.00
No. 2 lump, Illinois and Kentucky mines	$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅜ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base Per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Business Sufficient to Support 84 Per Cent Mill Operation—Rail Orders Total 100,000 Tons

CHICAGO, Sept. 25.—New business and specifications coming to Chicago district steel mills remain at the high level of recent weeks and are ample to support an ingot production at 84 per cent of capacity. The opening of fall rail buying, which in the week has totaled 100,000 tons, and the rather widespread belief that large railroad equipment purchases will be made before the end of the year offset to some extent the lack of confidence in the continuance of the present high demand from the building construction and automobile industries. Although deliveries of steel to automobile companies remain at a high rate, there is speculation as to how long this will continue. The sustained demand from the agricultural machinery industry is an important factor in the market.

Fourth quarter contracting is moving slowly. In fact, it is disappointingly small in total volume, considering that the turn of the quarter is less than a week away. Orders are larger in number, but smaller in size. Heavy specifications of recent weeks have resulted in the crowding of rolling schedules to the point where some third quarter tonnage will necessarily be delivered in October.

The No. 10 blast furnace at Gary, which was banked several weeks ago, has been brought back into service. There are now 24 active steel mill furnaces of 36 in this district.

Coke.—Shipments continue at a high rate and producers are drawing on stocks. Prices are firm at $8 a ton, f.o.b. local ovens.

Bolts, Nuts and Rivets.—Fourth quarter contracting is practically completed. Prices are firm. Future obligations compare favorably both in number and size with commitments for the three months' period now ending. Specifications are a trifle lighter, but stocks held by farm machinery builders are reported low and increased releases from that source are expected early in October.

Pig Iron.—The local pig iron market continues to show a moderate amount of activity. Large inquiries, among which is included 1000 tons for a melter in Milwaukee, are less numerous, and, with fourth quarter requirements well covered, there is also a drop in the number and volume of spot orders. Prices are firm, as indicated by sales during the week. Several users are showing interest in first quarter iron. Sales of silvery iron are fairly active, and prices show greater strength. A boat carrying a cargo of iron which grounded several weeks ago in Lake Erie has not reached its destination at Milwaukee, and it is now reported that it has been unloaded at Detroit.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil	18.50
High phosphorus	18.50
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	22.26
Low phos., sil. 1 to 2, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15%	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—A carload of ferromanganese has been purchased by a Chicago user at $105, seaboard. Prices for this commodity are strong, and there are intimations of advances for first half deliveries. Users of ferrosilicon are issuing liberal specifications. An order for 250 tons of 19 to 21 per cent spiegeleisen has been placed at $33 a ton, Hazard, Pa. This sale, as do others, indicates the stronger position of prices for this commodity.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $40.76.

Plates.—Over 8000 tons of plates have been ordered from Western mills for oil storage tanks to be erected in the Southwest. There is in the making an inquiry for 8000 to 10,000 tons of oil tankage steel for a producer in California. This business has come into the market rather unexpectedly. Shipments of pipe made from plates are heavier and promise to expand further as releases are made against recent heavy tonnage contracts. Mills are now receiving specifications for the tonnage required for the Great Northern car orders, including the equipment to be built in this railroad's own shops. Otherwise, the railroad car market is unusually quiet. Reports heard a week ago that cars will come into the market in good number by December are now more persistent, though positive statements to this effect are not to be had. Wear and tear on equipment now in use, earnings of railroads and the replacement of old wooden cars are given as reasons for an expected buying movement. On the other hand, there is no shortage of cars and the stress of moving farm products probably has passed the peak. Prices for plates are steady at 2c. to 2.10c. per lb., Chicago. Deliveries are satisfactory to buyers, particularly since producers make a close study of rolling schedules and adjust shipments to meet the needs of users, even at the risk of crowding into October tonnages that were specified against third quarter contracts.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Bars.—Mild steel bar mills are operating at close to capacity. Two weeks of heavy specifications have extended deliveries. Rolling schedules are better arranged, affording lower mill costs. Road machinery builders remain busy, and changes in the rate of specifying by the automobile industry are chargeable principally to new models. Orders from agricultural manufacturers indicate that they are enjoying the heaviest fall business on record. New buying is larger, and prices appear to be well established at 2c. to 2.10c. per lb., Chicago. Spot purchases of iron bars are more numerous, but forward buying is dull. Prices are unchanged at 2c., Chicago. Forward contracting in alloy steel bars has progressed rapidly this week, and indications are that the buying movement for the final period will be fully as heavy as for the third quarter. The total volume of specifications received in the last seven days compares favorably with shipments. Rail steel bars have been advanced $2 a ton to 1.95c. per lb., Chicago Heights. This increase in price followed a steady buying movement, during which most of the quarterly contracts were closed. Shipments are steady, and both Chicago Heights mills continue to operate on double turn.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c. to 1.95c., base, Chicago Heights mill.

Structural Material.—Higher prices for fabricated material and tightening in building loans now appear as the major factors in holding the local structural demand in check. Prices asked by shops are not far from $5 a ton higher than in midsummer. This advance is not all that fabricators had hoped to get, in view of small profit or none at all, and so at the moment they are holding rigidly to the gain already made. The backwardness of pending projects has made it necessary that mills give protection on the prices on which bids have been based. The deadline was originally set at Sept. 15, but that has now been pushed forward to Oct. 1 and even further extensions may be asked for. The contract for the Fine Arts Building, Chicago, calling for 5000 tons, will not come before the South Park Commissioners until about the middle of October. Revisions in the design of the Patterson Estate Building, Chicago, are delaying that project. Shops in Chicago and Milwaukee are busy, but backlogs are dwindling. Old projects, though numerous, are moving slowly, while new plans are few in number. Prices for structural material are steady at 2c. to 2.10c. per lb., Chicago.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Wire Products.—Not much can be said about the wire market other than that it is steady, but shows as yet very little of the impulse of fall buying. Forward purchasing has made some progress, and, judging by the character of orders and the insistence on prompt shipments, there is little room to suspect that speculation has entered this market. Mills are slowly building backlogs, the total at the

end of the third week in September having been larger by a fair margin than at the corresponding time a year ago. Specifications from the manufacturing trade are steady, but the needs of distributers are spotty and uncertain. The jobbing trade is developing slowly, being particularly spotty in the Central West and in the Northwest.

Rails and Track Supplies.—Rail purchases aggregate over 100,000 tons, of which 15,000 tons is for immediate delivery and the remainder is for shipment in November, December and in the early months of 1929. The Chesapeake & Ohio has ordered 45,500 tons, of which 39,000 tons will be rolled in Western mills. One-half of the 15,000 tons placed by the Great Northern will come to Chicago mills. The Union Pacific order for 40,000 tons will be divided, 30 per cent to local producers and the remainder to the Colorado mill. It is reported here that the Louisville & Nashville has ordered 50,000 tons of standard-section rails from the Tennessee Coal, Iron & Railroad Co. Recent purchases are affording steady operation of rail mills, the rate being about 50 per cent of capacity, and the annual repair period is no more definitely settled upon than it was a week ago. Sales of light rails are confined to scattered car lots. It is reported that two Western railroads are rapidly shaping their 1929 rail requirements. Business in track accessories is light and operations are pointing downward.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cold Rolled Bars.—Fourth quarter contracting is making rapid headway at prices that are well established at 2.20c. per lb., Chicago. Specifications have grown a trifle in the week and producers are operating steadily at 80 per cent of capacity.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. is reported to have taken 725 tons of 42-in. pipe for Milwaukee at $33, Birmingham, or $41.50 a ton delivered. The market is quiet except for car lot orders. Delivery on small business is prompt. Contractors are anxious to complete work before cold weather and they are asking for rush shipments against old contracts.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $42.20 to $43.20; 4-in., $46.20 to $47.20; Class A and gas pipe, $4 extra.

Old Material.—This market continues active, as many users buy to replace stocks that were depleted during the late summer months. Dealers are now willing to pay as high as $13.75 a gross ton, delivered, for heavy melting steel for delivery against old obligations. Steel mills are drawing heavily against old commitments. In a number of cases producers are holding back supplies in anticipation of higher prices. Among railroad lists this week are 1800 tons offered by the Nickel Plate and 1500 tons by the Chicago, Milwaukee, St. Paul & Pacific.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$13.00 to $13.50
Shoveling steel	13.00 to 13.50
Frogs, switches and guards, cut apart, and misc. rails	14.75 to 15.25
Hydraul. compressed sheets	11.50 to 12.00
Drop forge flashings	9.50 to 10.00
Forg'd. cast and r'l'd steel carwheels	16.50 to 17.00
Railr'd tires, charg. box size	16.50 to 17.00
Railr'd leaf spring cut apart	16.50 to 17.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	15.25 to 15.75
Coil springs	18.00 to 18.50
Electric Furnace Grades:	
Axle turnings	13.50 to 14.00
Low phos. punchings	15.50 to 16.00
Low phos. plate, 12 in. and under	15.00 to 15.50
Blast Furnace Grades:	
Axle turnings	11.00 to 11.50
Cast iron borings	10.00 to 10.50
Short shoveling turnings	10.00 to 10.50
Machine shop turnings	6.75 to 7.25
Rolling Mill Grades:	
Iron rails	14.75 to 15.25
Rerolling rails	16.00 to 16.50
Cupola Grades:	
Steel rails less than 3 ft.	17.00 to 17.50
Angle bars, steel	16.25 to 16.75
Cast iron carwheels	13.50 to 13.75
Malleable Grades:	
Railroad	15.00 to 15.50
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angles and splice bars	14.50 to 15.00
Iron arch bars and transoms	20.00 to 20.50
Iron car axles	24.50 to 25.00
Steel car axles	16.25 to 16.75
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	5.75 to 6.25
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	9.00 to 9.50
Cupola Grades:	
No. 1 machinery cast	15.00 to 15.50
No. 1 railroad cast	14.50 to 15.00
No. 1 agricultural cast	12.00 to 13.50
Stove plate	11.25 to 11.75
Grate bars	12.25 to 12.75
Brake shoes	11.25 to 11.75

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Sheets.—Sheet prices are firm, and it is believed by some observers of the market that an advance is not far in the future. Spot sales are numerous and specifications are in such volume that deliveries have been extended. Hot mills are engaged at close to capacity.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c. to 2.90c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Reinforcing Bars.—Large tonnage awards and inquiries are lacking. Competition is keener for small lots. Dealers are aiming for stability in prices on large orders for billet steel reinforcing bars. The level now sought is 2.30c. a lb., Chicago warehouse. Rail steel reinforcing bars have been advanced $2 a ton by warehouses. The Great Lakes Construction Co. is low bidder on the general contract for the 124th Field Artillery Armory, Chicago. This bid, however, is far above the estimate of cost and it is probable that bids will be rejected. New business and fresh inquiries are shown on page 802.

Tin Plate.—Shipments to date are running a trifle heavier than in the corresponding part of the last half of 1927. Spot orders are fairly numerous at unchanged prices.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.20c. to 2.80c.
Reinforc'g bars, rail steel	2.10c. to 2.80c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.65c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, stand. railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.30
Com. wire nails, base per keg	3.10
Cement c't'd nails, base per keg	3.10

Railroad Equipment

Central of Vermont Will Buy 500 Freight Cars

PURCHASE of 100 gondola cars by the Western Maryland and of 20 locomotives by the Canadian National were the outstanding transactions of the week's business, details of which follow:

Belt Railway of Chicago has purchased five eight-wheel switching locomotives from Baldwin Locomotive Works.

Western Maryland has ordered 100 gondola cars from Bethlehem Steel Co.

Sanitary District of Chicago has purchased 16 30-yd. air-dump cars and four 20-yd. air-dump cars from Magor Car Co.

Pittsburgh & Shawmut has ordered four caboose cars from Pressed Steel Car Co.

American Oil Co., Baltimore, has ordered two three-compartment tank cars from General American Tank Car Corporation.

Denver & Salt Lake is inquiring for one business car.

Canadian National Railways have bought 20 of a total inquiry for 55 locomotives from American Locomotive Co.

Central of Vermont is inquiring for 500 automobile cars.

Steel Mill to Be Built in Oklahoma

The Tulsa Rolling Mill Co., Tulsa, Okla., has authorized construction of a new plant at Sand Springs, Okla., to consist of two main one-story units, 135 x 430 ft., and 132 x 135 ft., for rolling mill and open-hearth plant.

Philadelphia

Fourth Quarter Steel Contracting Light—Sheet Mills Well Filled—Further Scrap Advances

PHILADELPHIA, Sept. 25.—Contracting for fourth quarter is rather limited. Sheet mills are heavily booked with specifications for early delivery and in most cases have sufficient tonnage on their books to maintain a good rate of operation for the next 60 days. This situation has developed from the activity of consumers in anticipating their requirements before Oct. 1, so as to obtain the benefit of the 2 per cent discount for cash in 10 days, which is to be discontinued by the mills Oct. 1. In consequence, a real test of present prices, which are firm, is expected to develop later in the quarter when mills have less tonnage on their books. Some last quarter contracts for steel bars have been made, large preferred buyers securing 1.90c., Pittsburgh, and others 1.95c. and 2c., Pittsburgh. On the few plate contracts closed thus far, the price range has been from 2.05c., Coatesville, for preferred buyers to 2.15c., Coatesville, for smaller users.

Pig Iron.—Pig iron prices are firm at $20, base furnace, on foundry grade, but with most consumers covered for the last quarter, and with sufficient iron in some instances to carry them over the first of the new year, no real test of the present prices has developed. Foundry iron buying is confined to small orders. There is a moderate demand for low phosphorus iron at unchanged prices. A large consumer at Trenton, N. J., is reported to have closed for a small tonnage of Bessemer iron with an eastern Pennsylvania steel company furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26
East. Pa. No. 1X	21.76
Basic (del'd east. Pa.)	$19.00 to 19.25
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Mills are well booked with fourth quarter tonnage and have a large volume of specifications against present contracts. Fourth quarter commitments are being made at 1.90c., Pittsburgh, or 2.22c., Philadelphia, with large buyers, with 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., Philadelphia, applying on smaller contracts. Deliveries are extended, most mills promising not less than three to four weeks.

Shapes.—Although fabricated steel prices are stronger than for some time, there is little change in shape quotations. Contracts for fourth quarter have been made in a few instances at 2.11c., Philadelphia, or on a basis of 2.05c., Pencoyd, Pa. Tonnages are being delivered on recent contracts made at 1.95c., Pencoyd, or 2.01c., Philadelphia.

Plates.—Buyers are beginning to show some interest in contracts for last quarter, and in a few cases requirements have been covered at 2.05c., Coatesville, paid by large preferred buyers, to 2.15c., Coatesville, or 2.25c., Philadelphia, for the smaller tonnages. With a number of desirable shipbuilding contracts in prospect, shipyards in this district are looking forward to more activity than in many months. Mills report that the railroads are specifying heavily against current contracts.

Sheets.—The volume of specifications and new contracts is smaller than that of the early part of the month, when buyers were endeavoring to secure the benefit of the 2 per cent discount for cash in 10 days, which terminates Oct. 1. Most mills are well booked for the next four to five weeks or longer and are maintaining the present price level firmly at 2c. to 2.10c., Pittsburgh, on blue annealed, 2.75c., Pittsburgh, on black, and 3.50c. to 3.60c., Pittsburgh, on galvanized. It is pointed out that a test of the strength of present prices may not develop until later in the fourth quarter, when mills have reduced the present backlog of tonnage on their books. Large consumers are said not to be accumulating stocks.

Warehouse Business.—There has not been much increase in the volume of buying during the month. September has been satisfactory, however, from the viewpoint of prices, which have been quite steady.

Imports.—In the week ended Sept. 22, 850 tons of Indian pig iron arrived at this port, also 2000 tons of chrome ore from Portuguese Africa and 35 tons of ferromanganese from the United Kingdom. Steel arrivals consisted of 334 tons of structural shapes from Belgium and 30 tons from France, 136 tons of steel bars from Belgium and 37 tons from France, 724 tons of steel blooms from France and 10 tons of steel hoops from the United Kingdom.

Old Material.—No. 1 heavy melting steel is unchanged at $15.50 to $16 per ton, delivered, but most other grades show advances of 50c. a ton or more. The market continues strong, but the recent rapid advance of prices, resulting from activity of dealers in filling contracts, has begun to diminish. Heavy breakable cast has been bought by an eastern Pennsylvania consumer at $17 per ton, delivered, and stove plate has brought $13 per ton, delivered. No. 2 melting steel has been sold at $13 per ton to a Harrisburg mill.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$15.50 to $16.00
Scrap T rails	15.00 to 15.50
No. 2 heavy melting steel	12.50 to 13.00
No. 1 railroad wrought	15.50 to 16.00
Bundled sheets (for steel works)	11.00 to 11.50
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	12.50 to 13.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	16.50 to 17.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel works)	12.50 to 13.00
No. 1 low phos., hvy., 0.04% and under	18.00 to 19.00
Couplers and knuckles	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
No. 1 blast f'nace scrap	10.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.50 to 15.00
Shafting	19 00 to 20.00
Steel axles	22.00 to 23.00
No. 1 forge fire	11.00 to 11.50
Cast iron carwheels	16.50 to 17.00
No. 1 cast	17.00 to 17.50
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling	15.50 to 16.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.60c.
Plates, ⅜-in.	2.80c.
Structural shapes	2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 2.75c.
Cold-fin. steel, rounds and hex	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.50c.
Steel bands, No. 12 to ⅛-in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c. to 5.80c.
⅜-in.	5.50c. to 6.00c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Plan Session With Gear Manufacturers

One session of the semi-annual meeting of the American Gear Manufacturers Association, which will be held at the Statler Hotel, Buffalo, Oct. 11-13, will be in conjunction with the machine shop practice division of the American Society of Mechanical Engineers. It will be held on the evening of Oct. 13.

Papers on "High-Speed Gearing—Some Requirements and How They Are Attained Commercially" and "Pratt & Whitney Gear-Shaving Process," by Ira Short, Westinghouse Electric & Mfg. Co., Philadelphia, and H. D. Tanner, Pratt & Whitney Co., Hartford, respectively, will be presented.

For storing road building and snow removal machinery for the Pennsylvania highway department the Blaw-Knox Co., Pittsburgh, will supply 23 steel storage buildings, mostly 40 x 128 ft. in size.

Cleveland

Recent Steel Specifications Have Given Mills Large Backlogs—Contracting Now Being Done for Fourth Quarter

CLEVELAND, Sept. 25.—There has been a slight falling off in specifications for steel bars, plates and structural material in the past week, which is due to the shutting off by most of the mills of the acceptance of orders against third quarter contracts. With these specifications, mills have heavy backlogs. While consumers are not yet taking a great deal of interest in the fourth quarter, outside mills have already closed quite a few contracts for that delivery at the new prices of 1.90c. to 2c., Pittsburgh, for steel bars, plates and structural material and 1.95c.to 2.05c., Cleveland, for steel bars. Although local bar mills have not definitely named prices for the fourth quarter, they appear to be tending toward a 1.90c., Cleveland, base, at which some business has been taken. Some buyers of structural material and plates have secured protection at present prices for material for work that they are figuring on.

Some resistance to price advances has developed from automobile manufacturers in the Detroit territory. These have placed heavy orders for their October requirements. Most automobile companies are scheduling a heavy output for October. The Chevrolet Motor Car Co. has discontinued shipping orders for steel for its present models and is in the market for stampings for its new models, on which it is expected to get under production about Nov. 1. The slowing down by this company while it is changing over to new models will probably cause a noticeable temporary falling off in the demand for steel from the motor car industry, as the Chevrolet company has been operating on a schedule of over 5000 cars per day.

Lake shipyards have received an inquiry for two car ferries, each requiring 2800 tons of steel, this being the first inquiry from this source for new boats for several months.

Pig Iron.—Sales by Cleveland interests in the past week aggregated 35,000 tons, which was about the same as in the previous week. The activity was largely in western Ohio, Indiana and in the Buffalo district. Locally, the market is at a standstill, as most foundries are covered for the remainder of the year. The market has a firm tone, but there are no further changes in prices. Sales of foundry and malleable iron by Cleveland furnaces for outside shipment were made at $17.50, establishing the recent 50c. a ton advance. Another Lake furnace, which is now on an $18 base, made several sales at that price. In Michigan, prices range from $18 to $18.50, furnace. The outstanding feature of the market is the continuance of the heavy demand. Shipments with some sellers this month so far show a gain over the corresponding period in August, which was a surprisingly good month. Shipping orders from the automotive industry indicate that automobile foundries will take as much iron in October as during the present month. Furnace stocks are being reduced considerably, and, if the demand holds up to present levels during the last quarter, furnaces that had large stock piles early in the year will have little iron in stock on Jan. 1.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$18.50
S'th'n fdy., sil. 1.75 to 2.25	22.25
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	$16.50 to 17.00
Stand. low phos., V'ley fur.	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Strip Steel.—Specifications for hot-rolled strip are keeping producers busy, although they do not have heavy backlogs. Large consumers are under contract for the last quarter at third quarter prices. Consumers of cold-rolled strip are rather slow in placing contracts. This product is quoted at 2.75c., Cleveland, to large buyers and at 2.85c. to small consumers.

Semi-Finished Steel.—Consumers are asking for fourth quarter quotations, but the price locally has not been definitely determined. Shipments are still being made against $32 and $33 contracts for sheet bars, billets and slabs.

Cold-Finished Steel Bars.—Consumers, particularly those making standard products, have specified heavily against third quarter contracts. Some fourth quarter contracts have been closed at 2.25c., Cleveland, or $2 a ton above the current price. Makers are following some of the hot-rolled bar mills in setting Dec. 10 as the deadline for specifications against fourth quarter contracts.

Wire Products.—Wire continues to move well and is firm in price. Nails are rather quiet, and price irregularities still exist in some sections.

Reinforcing Bars.—The Nickel Plate Railroad has placed 600 tons for track extension work in Cleveland. Inquiry is light. Efforts to get warehouse prices on higher levels are still being made, but so far have not met with much success.

Warehouse Business.—Some of the jobbers have announced that they will follow the mills in placing the one-half of 1 per cent discount in effect Oct. 1. Demand is fair, and there is little deviation from regular prices.

Sheets.—Quite a few current orders and contracts for the fourth quarter have been taken at the new prices of 2.75c., Pittsburgh, for black, 2c. for blue annealed and 3.50c. for galvanized. Sheet manufacturers appear satisfied with their efforts to get prices on a higher basis. Some of the mills are still taking specifications from contract customers who will be using sheets bought at the lower prices through October, so that the hardest test of the market may not come before the end of next month. Up to the present, the only deviation reported from the regular quoted prices is on blue annealed sheets. In Detroit, some of the large consumers in the automotive field have secured a 1.95c. price and a round-lot inquiry in this territory brought out a concession.

Old Material.—The market appears to have become fairly well stabilized at the prices that have prevailed recently. There is a moderate amount of activity on the part of dealers, who are paying $14 for No. 1 heavy melting steel and $10.50 for blast furnace scrap to cover short orders. While supplies are not excessive, dealers claim they are getting all the scrap they want at quoted prices. Large scrap lists for October are coming from the Michigan automobile plants. The lists already out include: Buick, 7300 tons; Dodge Brothers, 4600 tons, and Oakland, 2000 tons.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	13.00 to 13.50
Light bundled sheet stamp'gs	11.50 to 11.75
Drop forge flashings	11.50 to 12.00
Machine shop turnings	8.50 to 9.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	10.50 to 11.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops	16.00 to 16.50
Low phos., billet, bloom and slab crops	17.00 to 17.50
Low phos. sheet bar crops	16.50 to 17.00
Low phos. plate scrap	15.50 to 16.00
Blast Furnace Grades	
Cast iron borings	10.00 to 10.50
Mixed bor'gs and short turn'gs	10.00 to 10.50
No. 2 busheling	10.00 to 10.50
Cupola Grades	
No. 1 cast	16.00 to 16.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	16.75 to 17.25
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Coke.—Ohio by-product foundry coke has been reestablished at $7.75, Painesville, for October. Highly competitive conditions have developed in

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.40c.
Galvanized sheets (No. 24)	4.25c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb	$2.85
No. 9 gal. wire, per 100 lb	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

the by-product domestic coke market as a result of an increase in output. Detroit, which is a large consuming point, is rather commonly looked on as a dumping ground. Valley producers quote domestic coke at $4.50 per ton ovens for egg and $3.75 to $4 for nut. The Cleveland delivered prices are $6 for egg and $5.50 for nut.

Bolts, Nuts and Rivets.—Bolt and nut makers report that buyers are signing fourth quarter contracts freely at the present 70 per cent discount. Specifications are holding up to recent volume. Most of the tonnage contracted for during the quarter will be taken out. Stocks are low and prompt shipments are called for. Rivet consumers are beginning to send in fourth quarter contracts based on present prices.

New York

Buffalo Iron Now at $17 Minimum in District—Steel Contracts Made for Fourth Quarter

NEW YORK, Sept. 25.—Demand for pig iron is declining, as is to be expected following general contracting for fourth quarter, but prices are still gaining in strength. Furnaces are well booked and, in some cases, have fallen behind somewhat in deliveries. Those producers selling on a Buffalo base, or the equivalent, are now uniformly adhering to a minimum of $17, Buffalo, for No. 2 plain foundry iron. Foundry melt is holding its own, on the average, although there are still some jobbing foundries on an unsatisfactory operating basis. It is believed that the recent advance in pig iron prices stimulated castings orders, at the same time having a tendency to stiffen castings prices. While most melters have covered at least a substantial part of their fourth quarter needs, virtually no buying for first quarter has been reported. Buffalo furnaces, although not soliciting business for fourth quarter, have advanced prices 50c. a ton for that delivery. The Worthington Pump & Machinery Corporation, New York, has closed for 2000 tons for its Harrison, N. J., Holyoke, Mass., and Western plants. The American Radiator Co. has purchased 1500 to 2000 tons of foundry iron for its Gloucester, N. J., works. This company is completing extensive improvements to its blast furnace plant at North Tonawanda, N. Y.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.91
*Buf. No. 2, del'd east. N. J.	20.28
No. 2, del'd east. N. J. tidewater	$19.51 to 20.01
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.39 to 22.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.89 to 23.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Ferroalloys.—The report in our British cable on another page that British producers of ferromanganese have increased their export price about £1 per ton has not yet been reflected in this market. The British advance would mean a price of $110, seaboard, duty paid, but inquiry today has not uncovered any authorization for an advance above the prevailing price of $105. Sales in the past week of ferromanganese have been confined to carloads. In spiegeleisen one consumer took about 250 tons and there have also been sales of carloads and small lots, all for delivery this year.

Plates, Shapes and Bars.—Contracting for fourth quarter has started somewhat later than usual, but in the past week nearly all mills have covered a good many of their regular customers at prices ranging from 1.90c. to 2c., Pittsburgh, on bars and from 2.19½c. to 2.29½c., New York, on shapes and from 2.22½c. to 2.32½c., New York, on plates. The smaller contracts have in nearly all instances taken the top prices, representing a full advance of $2 a ton. Some mills have restricted the 1.90c., Pittsburgh base, on steel bars to buyers using 1000 tons or more within the quarter. Although some consumers will be permitted to specify against third quarter contracts until the end of this week, most of the specifications are in. On purchases for delivery after Oct. 1, not covered by third quarter contracts, the new prices will apply. September specifications for bars and structural shapes in particular and to a lesser extent in plates will run large. The leading Eastern producer of structural material reports that its September tonnage will be the largest for any month this year. One of the first inquiries resulting from the damage done in Porto Rico by the recent hurricane is for 350 tons of plates for a penstock. The New York Central will receive bids up to Oct. 2 on its fourth quarter steel requirements, and the Delaware, Lackawanna & Western is taking bids this week on its needs for the rest of the year. The New York Central and Pennsylvania railroads are expected to come into the market within a week or two for their 1929 rail requirements, about 200,000 tons or more in each case.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; struc. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Sheets and Strips.—Some mills are accepting orders this week for black sheets at 2.65c. and for galvanized sheets at 3.40c., Pittsburgh, but beginning Oct. 1 the new prices, which are $2 a ton higher, will apply. In view of the fact that nearly all buyers have sufficient sheets on order to provide for their requirements for a month or six weeks, little contracting for fourth quarter has been done. Hot-rolled strip steel buyers are covering for the remainder of the year at 1.90c., Pittsburgh, for 6 to 12 in., at 2c. for 3 to 6 in. and at 2.20c. for less than 3 in. The larger buyers of cold-rolled strip are having no difficulty in placing orders for last quarter requirements at 2.75c., Pittsburgh, although small buyers are being asked to pay 2.85c.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.60c. to 3.80c.
No. 22	3.75c. to 3.95c.
No. 24	3.80c. to 4.00c.
No. 26	3.90c. to 4.10c.
No. 28*	4.05c. to 4.25c.
No. 30	4.30c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.15c. to 4.35c.
No. 16	4.00c. to 4.20c.
No. 18	4.15c. to 4.35c.
No. 20	4.30c. to 4.50c.
No. 22	4.35c. to 4.55c.
No. 24	4.50c. to 4.70c.
No. 26	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Warehouse Business.—Jobbers report a decided improvement in the volume of orders in the past week, but some price shading is still in evidence, especially on sheets and structural material. The improved situation at the mills is viewed with satisfaction by warehouse sellers, who expect as a result an increasing volume of prompt shipment business and a firmer tone in their prices.

Cast Iron Prices.—Southern makers of pressure pipe have announced an advance in the Birmingham price of $2 a ton to $36 to $37 per ton, base. Northern foundries, however, continued to quote from $35.60 to $36.60 per net ton, delivered New York. Buying is almost entirely of small lots, many of less than 100 tons, to complete installations. Utility companies are providing most of the present activity.

Prices per net ton, deliv'd New York: Water pipe, 6-in. and larger, $35.60 to $36.60; 4-in. and 5-in., $40.60 to $41.60; 3-in., $50.60 to $51.60; Class A and gas pipe, $4 to $5 extra.

Reinforcing Bars.—More than 2000 tons of bars was placed during the week for jobs of 100 tons or more, and the general run of small orders was considerably heavier than usual. This is attributed to the advance of $2 a ton in price which is to be effective Oct. 1. A number of large jobs now under active negotiation will probably be closed before that date. Pending work continues to accumulate. Foundations for a bridge over the Kill van Kull connecting Staten Island and New Jersey will require about 500 tons and 400 tons will be needed for a building for the Brooklyn Ash Removal Co., Inc., in Brooklyn. About 550 tons of bars for another building for this company has been let to the McClintic-Marshall Co.

Coke.—Standard furnace coke prices are strong. For delivery into the next quarter, producers are asking about $3 per net ton, Connellsville, with $3.25 per ton asked on contracts for delivery over the entire quarter. For prompt shipment the usual market is $2.85 per ton. Standard foundry coke is quiet at $3.50 per ton, Connellsville. Special brands are still quoted at $4.85 per ton, ovens, or at $8.56 per ton delivered to northern New Jersey and Newark and $9.44 to New York and Brooklyn. By-product foundry coke prices are $9 to $9.40, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—Prices on most grades show a further slight advance on the basis of offers by dealers and brokers, but the extreme activity caused by the covering on lower priced contracts has begun to decrease. No. 1 heavy melting steel is quoted at $14 per ton, delivered Bethlehem, and $15, delivered Coatesville, Pa., and Claymont, Del. Yard grade of heavy melting steel is being bought at $11.75 per ton, Pottsville, $12.50 per ton, delivered Harrisburg and Phoenixville, Pa., while as much as $12.75 has been offered by some brokers. Stove plate for steel works is quoted by dealers at $12.50 per ton, delivered, machine shop turnings at $11.50 per ton, delivered, and heavy breakable cast at $16.50 per ton, delivered Harrisburg, Pa., and Florence, N. J.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel		$11.50
Heavy melting steel (yard)	$8.00 to	9.00
No. 1 hvy. breakable cast	12.50 to	13.50
Stove plate (steel works)	8.75 to	9.00
Locomotive grate bars	9.25 to	9.75
Machine shop turnings		7.50
Short shoveling turnings		7.50
Cast borings (blast furn. or steel works)	6.50 to	7.50
Mixed borings and turnings	6.00 to	6.50
Steel car axles	18.00 to	18.50
Iron car axles	24.75 to	25.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)		10.75
Forge fire	7.25 to	7.75
No. 1 railroad wrought	10.75 to	11.25
No. 1 yard wrot., long	8.75 to	9.25
Rails for rolling	11.50 to	12.00
Cast iron carwheels	13.00 to	13.50
Stove plate (foundry)	9.00 to	9.50
Malleable cast (railroad)		10.00
Cast borings (chemical)		11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast	$16.50
No. 1 hvy. cast (columns, bldg. materials, etc.) cupola size	14.50
No. 2 cast (radiators, cast boilers, etc.)	14.00

Bethlehem Objects to Proposed Water Freight Rates

H. G. Crawford, traffic manager Bethlehem Steel Co., voiced the objections of that company to rail and water rates from Eastern ports to the Southwest proposed by the Interstate Commerce Commission in the Southwestern rate case at a hearing at the rooms of the Merchants' Association of New York on Tuesday.

"The proposed basis as set forth by the commission," he said, "would either minimize our shipments to Houston and Galveston or force us to use unregulated lines or outside charters, with at least some penalty to the purchaser who had built up his business on the service accorded by the standard lines.

"Moreover, it would reduce the spread to which our Eastern location entitles us as compared with shipments originating in the Pittsburgh district and create an artificially high basis which is bound to affect us adversely in the competition we must face at the Gulf ports.

"To the Eastern producer the rail-ocean rates are of first importance, and their level controls in a large measure his ability to market his steel at Texas ports. I have previously pointed out that every steel manufacturer in Eastern territory is within 100 miles of New York, Philadelphia or Baltimore. The rail haul is therefore relatively short, as compared with the water haul, and the water rate has not for many years exceeded the 30c. level. Business is actively solicited on this basis.

"Most of the points reached by ocean-rail routes from Eastern producing points to Texas destinations are subject to the seaboard territory blanket rates of 87c. for 100 lb. as a maximum. This rate covers a wide range in both trunk line and Southwestern territory.

"The blanket rate idea is wrong in principle. It produces gross inequalities as between origin points. It holds down the long haul rate and gives no corresponding reduction to the shorter haul. As applied to Trunk Line-Texas traffic, it acts as a distinct handicap to Eastern manufacturers and deprives them of the benefits that would accrue to an Eastern location. It brings the Pittsburgh producer, through the application of a special rate concession, to the very threshold of our Eastern plants, without imposing upon him any of the disadvantages of an Eastern mill. We oppose the present adjustment as wholly illogical and unfair and urge its abolishment in any final realinement made as the result of this hearing."

Standard Proposed for Brass Seated Unions

WASHINGTON, Sept. 25.—A proposed commercial standard for black and galvanized types of brass seated malleable iron or steel screwed unions for use with standard weight pipe was approved at a general conference here yesterday held under the auspices of the commercial standards unit of the Bureau of Standards, Department of Commerce. It was agreed that new production, in accordance with the schedule as defined by the standard, would be in order May 1, 1929, with an extension until Nov. 1, 1929, for industry to use up existing stocks.

The standard will be subject to annual review by a standing committee so that it may be kept abreast of any changes taking place in the art. Members of this standing committee are: Robert E. Bryant, Jefferson Union Co., Lockport, N. Y.; Myron H. S. Affleck, Star Mfg. Co., Providence, R. I.; Stanley G. Cady, Rhode Island Fittings Co., Providence, representing the manufacturers; the Standard Sanitary Mfg. Co., Fleck Brothers, the General Fire Extinguisher Co., and the Hajoca Corporation, Philadelphia, representing the distributers; the Master Plumbers' Association, the Master Steamfitters' Association, the American Gas Co., and the Heating and Piping Contractors National Association, representing the consumers.

Pipe Plant in Prospect at Everett Furnace

An arrangement has been pending between the Warren Foundry & Pipe Co., Phillipsburg, N. J., and the Mystic Iron Works, Everett, Mass., for the establishment by the former company of a foundry for small sizes of cast iron bell and spigot pipe close to the furnace. Property has not been acquired for this purpose, final action awaiting decision of the city to close permanently certain streets now traversing the site.

St. Louis

Increase in Pig Iron Buying Follows Price Advance—Steel Specifications Satisfactory—Price Gains in Scrap

ST. LOUIS, Sept. 25.—A marked improvement in buying of pig iron has followed recent price advances. Consumers seemingly are more impressed with the strength of the price situation. The St. Louis Gas & Coke Corporation sold 7600 tons at the 50c. advance announced Sept. 14; the largest lot was 4300 tons of foundry iron bought by a radiator company. An East Side melter took 1000 tons and an Iowa jobber bought 400 tons of foundry grades, while 600 tons of low phosphorus iron went to a Southern pipe manufacturer. A local melter purchased 300 tons of malleable. The stove interests in Belleville, Quincy and St. Louis, especially those concentrating on novelty types of enameled heaters, are busy, as are jobbing foundries specializing in light castings. Tractor manufacturers are operating at full capacity and are planning to increase production. September shipments of pig iron promise to exceed those of August.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
N'th'n No. 2 fdy., deliv'd St. Louis.	20.16
Southern No. 2 fdy., deliv'd	20.67
Northern malleable, deliv'd	20.16
Northern basic, deliv'd	20.16

Freight rates: 81c. Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Buying of domestic grades of coke has been stimulated by cooler weather, and it is expected that it will steadily increase from now on. Takings of metallurgical coke are increasing.

Finished Iron and Steel.—Jobbers of sheets have been more active in placing orders with mills within the last few weeks in an effort to get in under the wire before the discount rate is cut from 2 per cent to one-half of 1 per cent. Orders received this week by some interests will bear the lower discount. Specifications for plates, shapes and bars have been satisfactory. Business with structural fabricators is quiet. The American Bridge Co. got the only award, 400 tons for a new zinc plant at East St. Louis. Warehouse business was lighter than in the preceding week.

Old Material.—The market for old material made further price gains during the week. Dealers are paying more for some items to cover contracts and also in anticipation of higher prices being paid by consumers. However, the mills are not buying except for immediate needs, and are showing slight interest in the market. Heavy melting steel, heavy shoveling steel, railroad springs, No. 2 railroad wrought, are up 25c., while machine shop turnings, rails for rolling, iron car axles, and No. 1 machinery cast are 50c. higher; railroad malleable is 75c. up and wrought iron bars and transoms are $1 higher. Railroad lists are the lightest in months, and shipments of material from other sources are small. Railroad lists include: International-Great Northern, three carloads; Frisco Lines, seven carloads, and Chicago, Milwaukee, St. Paul & Pacific, 10 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel	$12.00 to $12.50
No. 1 locomotive tires	12.50 to 13.00
Heavy shoveling steel	12.00 to 12.50
Miscel. stand.-sec. rails includ'g frogs, sw'ches and guards, cut apart	13.25 to 13.75
Railroad springs	14.50 to 15.00
Bundled sheets	8.25 to 8.75
No. 2 railroad wrought	12.00 to 12.50
No. 1 busheling	9.00 to 9.50
Cast iron boring	8.25 to 8.75
Iron rails	13.00 to 13.50
Rails for rolling	14.50 to 15.00
Machine shop turnings	8.00 to 8.50
Steel car axles	18.00 to 18.50
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	19.25 to 19.75
No. 1 railroad wrought	10.75 to 11.25
Steel rails, less than 3 ft.	15.50 to 16.00
Steel angle bars	13.50 to 14.00
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast	14.00 to 14.50
Railroad malleable	12.50 to 13.00
No. 1 railroad cast	13.00 to 13.50
Stove plate	11.00 to 11.50
Agricult. malleable	11.50 to 12.00
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.95c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.15c.
Galv. corrug. sheets	5.00c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Boston

Export Scrap Market Is More Active—Pig Iron Sales Drop Off—Coke Demand Good

BOSTON, Sept. 25.—The past week in the pig iron market was one of the quietest this year. Most of the large melters have covered fourth quarter requirements but none has bought for first quarter. Current sales are to small foundries which overstayed the market and which are reluctant to pay advanced prices, or larger foundries needing special brands for mixture purposes. Recent sales included Alabama, Buffalo, Champlain, Mystic, Pennsylvania and some imported irons. Sales of Mystic iron were the smallest in many weeks. Based on the present rate of New England melt, next month should bring a resumption of buying for fourth quarter and also some first quarter buying. It is believed that first quarter buying will run at least 50 per cent ahead of that for first quarter of this year.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25		$21.91
*Buffalo, sil. 2.25 to 2.75	$21.91 to	22.41
†Buffalo, sil. 1.75 to 2.25		20.78
†Buffalo, sil. 2.25 to 2.75	20.78 to	21.28
East. Penn., sil. 1.75 to 2.25		23.65
East. Penn., sil. 2.25 to 2.75		24.15
Va., sil. 1.75 to 2.25		25.71
Va., sil. 2.25 to 2.75		26.21
Ala., sil. 1.75 to 2.25	23.16 to	25.02
Ala., sil. 2.25 to 2.75	23.66 to	25.52

Freight rates: $4.91 all rail and $3.78 rail and water from Buffalo; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to 8.77 from Alabama.
*All rail rate. †Rail and water rate.

Imports.—During the first half of September, 1278 tons of foreign pig iron was received at Boston, consisting of 534 tons of Dutch, 644 tons of Indian and 100 tons of Scotch. On Sept. 15, 10,030 tons of Wabana ore arrived at the Mystic Iron Works, Everett, Mass.

Coke.—New England ovens have increased their foundry coke output and have made some progress toward catching up on back orders. Indications are the ovens will make no change in their contract price of $11 a ton delivered, within a $3.10 freight

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

rate zone on Oct. 1. That price has not been changed since early this year. Domestic coke is selling in volume. A record turnover in domestic fuel by the New England Coal & Coke Co. and the Providence Gas Co. is expected. The New Haven coke plant is not yet in production.

Cast Iron Pipe.—Massachusetts will close bids Sept. 26 on 316 tons of 6, 8 and 10-in. pipe and 12 tons of special fittings for the new State Hospital at Waltham, Mass. Harry T. Stephens, United Bank Building, 152 Market Street, Paterson, N. J., is in the market for 1200 ft. of 6-in. pipe for a Massachusetts water works. Private pipe business continues in good volume, although it is not as heavy as a week ago. Pipe makers are still willing to make sizable concessions on large pipe because they are not sold ahead to the extent they were a year ago. They are well filled up with small pipe business; consequently prices on these sizes are quite firm. A small consignment, 135 pieces, of cast iron pipe from Antwerp was unloaded in Boston recently, the first importation of pipe here since September, 1927.

Fabricated Steel.—Prospective fabricated steel business has dropped off in the past month and shops will have to curtail operations in the fourth quarter unless new business develops. Two months ago it was believed they had sufficient backlogs to carry them through 1928, but, with a slowing up in new work and high operating schedules, jobs have been completed sooner than was expected. It is probable that the United Shoe Machinery Corporation's new building in Boston and a large downtown office building will come up for figuring within two months.

Old Material.—The upswing in old material prices has been checked, temporarily at least. Brokers are still moving sizable tonnages out of New England, mostly into the Pittsburgh territory. Yards adjacent to New England foundries are disposing of considerable machinery and textile cast, although the supply of the latter has materially dropped within the past two months. In addition, sizable tonnages of No. 1 machinery cast are going to the Pittsburgh district. A local broker is loading 3000 tons of street railway rails, automobile scrap and other material for Baltimore. It is intimated that this material is going to Europe. Within the next week or two a steamer will load several thousand tons of scrap, mostly automobile, at Boston for export to Danzig. New England will probably ship many thousands of tons of scrap abroad between now and Jan. 1.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.50 to $10.75
Scrap T rails	10.00 to 10.50
Scrap girder rails	9.50 to 10.00
No. 1 railroad wrought	9.00 to 9.50
No. 1 yard wrought	8.00 to 8.50
Machine shop turnings	6.00 to 6.50
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	8.00 to 8.50
Forge flashings	8.50 to 9.00
Blast furnace borings and turnings	6.00 to 6.50
Forge scrap	6.00 to 6.50
Shafting	14.00 to 14.50
Steel car axles	15.50 to 16.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.00 to 9.50
Rails for rolling	9.50 to 10.00
Cast iron borings, chemical	9.50 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.50 to 16.00
No. 2 machinery cast	13.50 to 14.00
Stove plate	10.00 to 10.50
Railroad malleable	15.00 to 15.50

Youngstown

Market Developments Encouraging to Valley Producers—Unfilled Tonnage Larger Than at Opening of Third Quarter

YOUNGSTOWN, Sept. 25.—There is a distinct note of encouragement in the iron and steel trade developments affecting this area. Production schedules are climbing and the price structure is strengthening. Output in the Mahoning Valley reaches a peak for the year in the last week of the third quarter. The independent industry enters the fourth quarter with larger unfilled tonnages than at the beginning of the third quarter. Sheet makers are booked four to six weeks ahead. Producers of full-finished sheets expect to operate at a capacity rate well into November. Black sheets are strengthening at 2.75c.

It is safe to say that not at any time this year have prospects for the steel industry in northeastern Ohio been so favorable as they are now. The August payroll of over $7,000,000 established a new monthly record for the year. Third quarter earnings of independent steel companies will be larger than for either of the two preceding quarters, thus reversing the situation which ordinarily prevails in this respect.

The Republic Iron & Steel Co. adds this week a blast furnace in its Haselton group, anticipating the blowing out for repairs and relining of the stack at Warren operated by the Trumbull-Cliffs Furnace Co. This resumption gives the Republic company four active furnaces in the Haselton group.

The Youngstown Sheet & Tube Co. is averaging 78 per cent operation at all of its properties, and is at 83 per cent in the Youngstown district. Its seamless tube mills are on double turn. Of 20 tube mills in this area, 15 are under power; 113 of 127 sheet mills are rolling; independent tin mills are active at close to a capacity rate; bar mills are operating at 65 per cent with the independents, and at 75 per cent with the Steel Corporation subsidiaries; strip mills are operating at nearly 100 per cent.

The Sharpsville Furnace Co. plans to blow in this fall its merchant stack, idle since June; the Struthers Furnace Co. may start its merchant furnace, idle most of the year; the A. M. Byers Co., Pittsburgh, is also scheduled to operate its Mattie blast furnace at Girard. The Sheet & Tube company will take off one of its two active furnaces in its Brier Hill group.

The Republic Iron & Steel Co. is making constant minor improvements at its Warren properties, acquired by purchase of the Trumbull Steel Co. It is also preparing for the operation of Steel & Tubes, Inc., recently purchased. Under the new management, the company has introduced drastic economies in the operation of its plants.

The Sharon Steel Hoop Co. has made trial runs of new cold-strip steel installations at Sharon, Pa., which will get into production during the year's final quarter.

The Byers company is increasing the production of puddled iron by the Aston process at its leased plant in Warren, and the successful production of this iron on a commercial basis is creating wide interest. However, heavy expenditures will have to be made by the company for the conversion of its product into finished or rolled form.

European Open-Hearth Output Large, Exports Small

HAMBURG, GERMANY, Sept. 8.—While the use of open-hearth steel in Continental steel-producing countries is rather large in some instances, exports of this grade are insignificant. In Germany, the relation of Thomas steel to open-hearth steel production is 45 to 55, but in export business the relation is about 90 to 10, except for plates, on which the ratio is 60 to 40. Obviously, German manufacturers consume practically all the German open-hearth production, some of which is exported in the form of machinery and hardware products.

Output of Thomas and open-hearth steel in Luxemburg is in a ratio of 98 to 2, and no open-hearth grade is exported. In Belgium, the relation of Thomas to open-hearth production is 80 to 20 and in export sales it is 98 to 2. Of the average French production of nearly 800,000 tons of steel monthly, about 75 per cent is Thomas steel, while that grade represents 95 per cent of total exports. In Poland, 65 per cent of the total steel output is open-hearth metal. In export trade, however, only about 35 per cent of its shipments is open-hearth steel and the rest is Thomas grade. Czechoslovakia exports about 40,000 tons of steel monthly, of which more than 90 per cent is Thomas quality, whereas 40 per cent of the 100,000 tons of steel produced each month is open-hearth grade.

Pacific Coast

Cast Iron Pipe Leads in Activity—Fair Volume of Business in Steel Products

SAN FRANCISCO, Sept. 22 (*By Air Mail.*)—Awards of steel products during the past week were by no means heavy, but a fair volume of business is pending. The cast iron pipe market was the most active and three fair-sized projects were placed. Among these were 1500 tons for Signal Hill, Cal., and 1467 tons for Clearwater, Cal., both booked by the American Cast Iron Pipe Co. No action has yet been taken on the inquiries put out by the Shell Oil Co. and the General Petroleum Corporation for oil storage tanks requiring over 9000 tons of plates.

Pig Iron.—Trading in foundry pig iron is limited to unimportant lots for prompt shipment. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—While a number of projects involving lots of from 20 to 50 or 60 tons of reinforcing steel bars were placed this week, larger awards were limited to three jobs. The Pacific Coast Steel Co. took 200 tons for a plant for the Simmons Co., San Francisco, and an unnamed interest secured 390 tons for an apartment and 130 tons for a club building in Los Angeles. Bids were opened this week on 525 tons for the Bernal Cut project, San Francisco. About 600 tons is involved in buildings for the Government at Fort Lewis, Wash. Bids have been opened on 225 tons for a hotel at Santa Cruz, Cal. Low prices on out-of-stock material continue to prevail in the San Francisco and Los Angeles districts, and 1.80c., base, appears to be general.

Plates.—The Steel Tank & Pipe Co. of Oregon took the only large job involving plates. This called for 175 tons for a 54-in. welded pipe line at Tacoma, Wash. Action is expected during the next week or 10 days on the inquiries for 14 82,000 bbl. tanks for the General Petroleum Corporation, Los Angeles, calling for 5000 tons and on the inquiries of the Shell Oil Co. for 15 80,000 bbl. tanks, involving 4600 tons. Bids will be called for next week on 1200 tons for a pipe line at Hood River, Ore. Plate prices continue to range from 2.20c. to 2.25c., c.i.f.

Shapes.—Only one structural shape award exceeding 100 tons was placed during the week. The Golden Gate Iron Works took 150 tons for an apartment in San Francisco. Bids will be opened next week on 243 tons for the Gardiner bridge over the Yellowstone River in Montana and bids have been called for by the Great Western Power Co., San Francisco, for the India Basin power plant involving close to 2000 tons of material. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—Cast iron pipe awards this week were the heaviest since the last week of April and totaled 4096 tons. The American Cast Iron Pipe Co. took 1502 tons of 4 to 18-in. Class B pipe for Signal Hill, Cal, and 1467 tons of 4 to 10-in. Class B pipe for Clearwater, Cal. George Nelson & Co. were awarded 949 tons of 8 to 30-in. Class C pipe for the improvement of Denny Hill, Seattle. San Diego placed 178 tons of 4 to 10-in. Class B pipe for the improvement of Mount View Drive with V. R. Dennis Construction Co. Pending business is of light proportions, with only four projects pending. These involve 142 tons of 4 to 14-in. Class B pipe for Oxnard, Cal., bids on which will be opened Sept. 25; from 263 to 537 tons of 2 to 12-in. Class B pipe for Phoenix, Ariz.; 282 tons of 6 to 12-in. Class B and C pipe for Sixth Avenue, N. W., Seattle, and 22.000 tons for the East Bay Municipal Utility District in Oakland.

Standard Pipe.—Movement of oil country goods in the southern part of the State continues unabated, and some fair-sized lots of well casing have been booked. Demand for line pipe tonnage is light. Standard steel pipe is in better demand and distributers are beginning to replenish depleted stocks.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	5.00c.
Blue ann'l'd sheets (No. 10)	4.00c.
Galv. sheets (No. 24)	5.40c.
Struc. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100-lb. keg	3.40

Canada

Structural Steel Leads in Activity in Dominion Markets—15,000 to 20,000 Tons in St. John, N. B., Projects

TORONTO, ONT., Sept. 25.—Pig iron sales for the week failed to reach the high average of the two or three weeks previous, but business continues at a satisfactory level. Upward of 60 per cent of melters have covered to the end of the year, and although additional contracts are continually being closed, the rush appears to be over. One forward contract for about 5000 tons of iron was booked last week, but most of the current demand is for spot delivery. A stiffening in prices has had a tendency to bring lagging buyers into the market.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	25.00
No. 2 fdy., sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Structural steel sales continue to hold a prominent place in the iron and steel markets of this country, and at the moment there is little prospect of a decided slump. Contracts awarded during the week include 2000 tons to the Dominion Bridge Co., Montreal, for a bridge over the ship canal at Welland, Ont., and 1000 tons of reinforcing bars to the Canadian Bridge Co., Walkerville, Ont., for a distillery plant at Amherstburg, Ont., for Border Brewers & Distillers, Ltd. In addition, about 5000 tons was placed in lots ranging from 100 to 400 tons. Prospects include 15,000 to 20,000 tons for a bridge and 12 warehouse buildings at St. John, N. B., for the St. John Harbor Commissioners; 1500 tons of structural steel and 300 tons of reinforcing bars for Pathological Building for University of Toronto, Toronto; 8000 tons of structural steel for office building in Montreal for H. M. Caiserman & Henry Rieder; 1000 tons reinforcing bars for office building at Bleury and Sherbrooke Streets, Montreal, for J. Lewinson, 5010 Sherbrooke Street West; 400 tons reinforcing bars for garage for C. T. A. Hart, St. Catharine and Chomedy Streets, Montreal.

Old Material.—Following the strong demand for old material during the past two or three weeks, business has fallen off, but is still holding at a fairly high level. The prospect of higher prices has resulted in considerable new business being placed both for spot and future delivery. Prices are strong but unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$9.00	$7.00
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron	16.00	22.00
No. 1 machinery cast	....	16.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Buffalo

Higher Pig Iron Prices Established on Small Sales—Scrap Strong on Active Demand

BUFFALO, Sept. 25.—Pig iron business is being taken at the advanced prices quoted, but not in volume. Prices appear to be holding firm on the small lots being sold in the district and in New England. The only inquiry for a sizable lot is for 500 to 1000 tons of foundry from the Westinghouse Air Brake Co. This is reported to have been closed. First quarter business is being quoted at 50c. more per ton than last quarter business. Operations are unchanged.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$17.00 to $18.00
No. 2X fdy., sil. 2.25 to 2.75	17.50 to 18.50
No. 1X fdy., sil. 2.75 to 3.25	18.50 to 19.50
Malleable, sil. up to 2.25	17.50 to 18.50
Basic	17.00 to 17.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—Bar and shape prices are firm at 2.10c., Buffalo, with demand good. Some bar deliveries have been slowed up. Sheets are quite active, with black firm at 2.75c.; galvanized at 3.50c. to 3.60c., and automobile body at 4c. Bolt and nut prices are good, and the operation is better than average. Reports on Canadian steel business are very favorable, the best in years. The contract for fabricating the steel, about 1150 tons, for the Bliss & Laughlin plant in Buffalo has been awarded.

Old Material.—Prices of No. 1 heavy melting steel have stiffened to $15.75 to $16. The latter price is said to have been paid for part of several thousand tons. Dealers are said to be paying $15 to $15.50 for strictly No. 1 heavy melting steel. The largest consumer of scrap in this territory is expected to come in the market very shortly. It is said that considerable lots of machine shop turnings, No. 2 steel and shoveling turnings are being shipped out of this district, attracted by better prices in Pittsburgh. More scrap is said to have been purchased here within the past month than during the previous six months.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$15.75 to $16.00
No. 2 heavy melting steel	13.00
Scrap rails	14.50 to 15.00
Hydraulic comp. sheets	13.00
Hand bundled sheets	11.00 to 11.50
Drop forge flashings	13.00 to 13.50
No. 1 busheling	14.25 to 14.75
Hvy. steel axle turnings	12.00 to 12.50
Machine shop turnings	7.00 to 7.50
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades	
Knuckles and couplers	16.50 to 17.00
Coil and leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phos. billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Hvy. steel axle turnings	12.00 to 12.50
Short shov. steel turnings	11.50 to 12.00
Blast Furnace Grades	
Short shov. steel turnings	11.50 to 12.00
Short mixed borings and turnings	9.50 to 10.00
Cast iron borings	9.50 to 10.00
No. 2 busheling	10.50 to 11.00
Rolling Mill Grades	
Steel car axles	18.00 to 18.50
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	15.00 to 15.50
Stove plate	13.50 to 14.00
Locomotive grate bars	12.00 to 12.50
Steel rails, 3 ft. and under	17.00 to 17.50
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.70c. to 5.05c.
Blue ann'l'd sheets (No. 10)	3.70c.
Com. wire nails, base per keg	$3.65
Black wire, base per 100 lb	3.90

Birmingham

Pig Iron Sales Increase Slightly—Steel Demand Steady and Is Keeping Southern Mills Well Scheduled

BIRMINGHAM, Sept. 25.—Pig iron sales during the week showed an increase over those of the previous week. The market is firmer. A few of the orders extend through the fourth quarter at the current price of $16.25. Practically all October requirements have been covered and a good portion of the November iron is under contract. Shipments approximate the make, with a little surplus iron being moved. A few instances of increased melt have been noted among the foundries and machine shops. Furnace operations remain unchanged; of the 18 furnaces in blast, nine are on foundry, seven on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$16.25
No. 1 fdy., 2.25 to 2.75 sil.	16.75
Basic	16.25

Finished Steel.—Last week's sales and inquiries were up to the average of the past few weeks. Mill schedules are better filled than at any time in recent months. Structural shapes are active and the sheet market is strong. A good volume of finished steel has been shipped by barge down the Warrior River for distribution in the Southwest, principally Texas. The Tennessee company is completing work on a new cotton tie mill at Fairfield. Structural steel business is improving a little. Reinforcing bar awards are in small lots, but the total volume is fairly satisfactory. For the past two weeks the Tennessee company has been operating six open-hearths at Ensley and six at Fairfield, while the Gulf States Steel Co. has been working four at Alabama City.

Cast Iron Pipe.—The only tonnage of importance to develop in several weeks is a project at Dallas, Tex., requiring about 16,000 tons, and a fair-sized project at Mobile, Ala., still pending. Aside from these, the market is quiet. Plant operations are being maintained by the usual run of small orders. Shipments are up to the average and are about equal to output. Makers are adhering to the quotations of $34 to $35 on 6-in. and larger sizes.

Coke.—Domestic coke is in active demand, but activity in foundry coke is limited, as all of the important consumers are covered through the year and most of them through the first quarter of next year. A few spot sales are being made. Shipments on contracts have increased a little in the last few days. Quotations are unchanged from the $5 base for both spot and contract coke.

Old Material.—A steady volume of small-lot sales has followed the recent advances in prices. Consumer interest is greater than at any time in several months, and the market has a fairly firm tone.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$10.00 to $11.00
Scrap steel rails	11.50 to 12.00
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	14.00
No. 1 cast	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem	13.50 to 14.00

Detroit Scrap Market

DETROIT, Sept. 25.—The market on old material continues strong in the district. Prices are the same as quoted a week ago.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$12.00 to $12.50
Borings and short turnings	8.00 to 8.50
Long turnings	7.00 to 7.50
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul, comp. sheets	11.50 to 12.00
Stove plate	11.00 to 12.00
No. 1 busheling	9.50 to 10.00
Sheet clippings	7.50 to 8.00
Flashings	10.00 to 10.50

Total apparent consumption of babbitt metal in August was 4,755,662 lb., compared with 4,692,825 lb. in July and with 5,496,659 lb. in August, 1927, according to reports received by the Department of Commerce from 31 firms.

Cincinnati

September Orders for Sheets Unusually Heavy—Pig Iron Trade Dull But Prices Are Firm

CINCINNATI, Sept. 25.—Pig iron sales dropped off sharply in the past week, and inquiries before the local trade are negligible. Sellers are of the opinion that most consumers have contracted for their requirements during the remainder of the year and that there will be little important buying in the next 30 days. The slackening of interest, however, has not affected prices, which remain firm. This strength is attributed to the fact that the furnaces supplying users in this district have well-filled order books and are not keen about soliciting further business at the moment. At least one northern Ohio seller is reported to have withdrawn from the market. Lake interests are said to be holding to a minimum of $17.50, base furnace, while Alabama and Tennessee companies are adhering to $16.25, base Birmingham. Jackson County silvery furnaces have on hand a liberal volume of specifications and orders. At Ironton, there is only a small tonnage of unsold iron in furnace yards.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$18.89 to $19.89
So. Ohio malleable	20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25	19.94
Ala. fdy., sil. 2.25 to 2.75	20.44
Tenn. fdy., sil. 1.75 to 2.25	19.94
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Warehouse Business. — Sales this month are closely paralleling those of August. Bars, structural shapes and plates are the leading products in volume of orders. Aside from continued irregularities in common wire nails at Louisville, prices are steady.

Finished Material. — Orders and specifications booked by district sheet makers in September are considerably in excess of output, which has been maintained at almost 100 per cent of capacity. Demand from various consuming lines has been well balanced, and indications are that the flow of business from diversified sources will continue in the immediate future. Sales of electrical sheets have been of substantial volume, while shipments to automobile manufacturers have not slackened. The fourth quarter schedule of prices has become more firmly established, and no deviations are noted. Movement of wire products is better. Common wire nails are being shipped into Cincinnati at a delivered price under $2.69 per keg, but an effort is being made to set up that figure as minimum for the remainder of the year. Activities in structural steel are showing signs of a recovery after a somewhat dull period so far as fresh bookings are concerned.

Coke.—The coke market continues to show strength. Demand from foundries using by-product coke has been well sustained, and the colder weather has begun to stimulate the sale of domestic grades. By-product foundry will remain at $7 per net ton, f.o.b. ovens, during October. Domestic schedules also will be unchanged, with egg size selling at $4.50, ovens, and walnut at $3.50.

Old Material. — Dealers' activities have continued to give the market an element of strength, although prices in the past week have remained virtually stationary. District steel plants are taking normal tonnages on current contracts. Railroads this month have been securing exceptionally good prices for their scrap, dealers in some cases having paid considerably more than present selling schedules warrant.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$12.50 to $13.00
Scrap rails for melting	13.00 to 13.50
Loose sheet clippings	9.25 to 9.75
Bundled sheets	10.00 to 10.50
Cast iron borings	8.50 to 9.00
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	6.00 to 6.50
Rails for rolling	13.00 to 13.50
No. 1 locomotive tires	13.00 to 13.25
No. 2 railroad wrought	12.50 to 13.00
Short rails	17.00 to 17.50
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	16.00 to 16.50
No. 1 railroad cast	13.00 to 13.50
Burnt cast	8.00 to 8.50
Stove plate	9.25 to 9.75
Brake shoes	10.25 to 10.75
Railroad malleable	12.25 to 12.75
Agricultural malleable	11.25 to 11.75

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.75c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap-weld. steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Detroit

Employment Records Broken—High Production Rate Continues at Leading Automobile Plants

DETROIT, Sept. 25.—Detroit's industrial employment has again broken all records, according to the labor barometer of the Detroit Employers' Association. The total, as of Sept. 18, is 300,759, an increase of 415 over the figure of Sept. 11. The corresponding figure of a year ago was 196,834.

A new line of commercial cars and trucks will soon be introduced by the Chrysler Corporation. These units will run in the half-ton and three-quarter-ton class, and are probably forerunners of a complete line of trucks which will include units of larger capacity.

The total August production of the Chrysler Corporation, including the newly acquired Dodge property, will run about 55,000 units. It is estimated that the total production for the Chrysler Corporation will reach a half million units during the year. It is reported that 40,000 employees are now at work in the Chrysler plants.

In August the General Motors Corporation shipped 186,653 units to its sales offices, whereas in August, 1927, it shipped 155,604 units. Deliveries to customers during the past month amounted to 187,463 against 158,619 a year ago. Total sales to dealers for the first eight months were 1,439,442. Sales to consumers in the same period were 1,427,924.

It is estimated that Olds Motor Works will in September nearly equal its August production of 7773 units, which was a record.

Additions to the plants of the Seaman Body Co. are expected to increase capacity to 1200 units a day. This becomes necessary to handle the recent order from the Nash Motors Co. New buildings and equipment will cost approximately $2,000,000, and all plants will run at full capacity well into the winter.

Steel Fabricators to Meet in November

The sixth annual convention of the American Institute of Steel Construction, Inc., will be held at Biloxi, Miss., Nov. 13 to 17, inclusive. Problems of merchandising and of standardizing of products, says Charles F. Abbott, executive director of the association, will be the chief subjects for discussion.

Standardization already accomplished by the institute, Mr. Abbott adds, is saving the builders of the United States approximately $30,000,000 per annum on current contracts.

The fall meeting of the American Refractories Institute will be held Oct. 24 at the William Penn Hotel, Pittsburgh. The meeting will be devoted to the discussion of specifications and will be a continuation of the specification symposium of the spring meeting at White Sulphur Springs, W. Va.

Non-Ferrous Metal Markets

Copper Again Advanced, Tin Active and Strong, Lead and Zinc Quiet and Steady

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Sept. 25	Sept. 24	Sept. 22	Sept. 21	Sept. 20	Sept. 19
Lake copper, New York	15.25	15.25	15.00	15.00	15.00	15.00
Electrolytic copper, N. Y.*	15.00	15.00	14.75	14.75	14.75	14.75
Straits tin, spot, N. Y.	48.62½	49.00	....	49.00	48.00	48.00
Lead, New York	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis	6.32½	6.32½	6.32½	6.32½	6.32½	6.32½
Zinc, New York	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

Copper.—Quotations have again been advanced ¼c., electrolytic copper now selling for 15.25c., delivered in the Connecticut Valley, with the price of Copper Exporters, Inc., standing at 15.50c., c.i.f. European ports. Demand from consumers, both foreign and domestic, particularly the former, has been so heavy for another week that the advance was attributed to this as the main cause. As early as Saturday, Sept. 22, electrolytic copper sold at 15.25c., delivered in the Connecticut Valley, but the actual announcement of the advance was not made until Monday, Sept. 24. September will record a new record for total sales, exceeding the heavy demand in May. The total for the month to Sept. 22, inclusive, is estimated at over 200,000 tons, of which at least 70,000 tons was for export. Most domestic consumers are covered for October and November and sales at present are largely for December. Foreign consumers have taken about 60 per cent of their October requirements, 40 per cent for November and about 25 per cent for December. Some producers are out of the market for certain deliveries. Higher prices are predicted by some and not expected by others. Further heavy buying for foreign consumption might cause an increase, but yesterday and today, Tuesday, the market was much quieter. Lake copper is also higher at 15.25c. to 15.37½c., delivered, with sales made as far ahead as December.

Tin.—Sales for the week ended Saturday, Sept. 22, were about 1500 tons, bringing the total for the last five weeks close to 8000 tons. Friday, Sept. 21, was the most active day, with 800 tons changing hands. During the week consumers bought some, but the bulk was taken by dealers, with October-November delivery largely involved. Yesterday, Monday, was active with 400 tons taken by dealers. Today, Tuesday, the market was very quiet with spot Straits quoted at 48.62½c., New York. London prices were considerably higher than a week ago, with spot standard quoted at £223 10s., future standard at £219 and spot Straits at £226. The Singapore market was £221. Arrivals thus far this month are 8065 tons with 5420 tons reported afloat.

Lead.—A heavy business was done yesterday, Monday, and the market was quite active Tuesday, with quota-

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	50.50c. to 51.50c.
Tin, bars	52.50c. to 53.50c.
Copper, Lake	16.25c.
Copper, electrolytic	16.00c.
Copper, casting	15.25c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig	7.50c. to 8.00c.
Lead, bar	9.25c. to 10.25c
Antimony, Asiatic	13.00c. to 13.50c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commerc'l grade,	30.00c. to 40.00c.
Solder, ½ and ½	32.50c. to 33.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	53.88c.
Tin, bar	56.88c.
Copper, Lake	16.00c.
Copper, electrolytic	16.00c.
Copper, casting	15.25c.
Zinc, slab	8.00c.
Lead, American pig	6.85c. to 7.10c.
Lead, bar	9.50c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	57.00c.
Solder, ½ and ½	31.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.75c.
Copper, hot rolled	24.50c.
Copper, cold rolled, 14 oz. and heavier	26.25c.
Seamless Tubes—	
Brass	24.62½c.
Copper	25.50c.
Brazed Brass Tubes	27.75c.
Brass Rods	17.50c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products were advanced ¼c. per lb. on Sept. 24, following a similar advance on Sept. 17. Zinc sheets have been quoted at 9.75c., base, since July 30, and lead full sheets at 10c. to 10.25c. since May 29.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.75c.
Copper, hot rolled	24.00c.
Zinc	9.75c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	24.62½c.
Copper	25.50c.
Rods—	
High brass	17.50c.
Naval brass	20.25c.
Wire—	
Copper	17.25c.
High brass	20.25c.
Copper in Rolls	23.00c.
Brazed Brass Tubing	27.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	12.75c.	14.25c.
Copper, hvy. and wire	12.50c.	13.50c.
Copper, light and bottoms	11.00c.	12.00c.
Brass, heavy	7.25c.	8.25c.
Brass, light	6.25c.	7.25c.
Hvy. machine composition	9.75c.	11.00c.
No. 1 yel. brass turnings	9.00c.	9.625c.
No. 1 red brass or compos. turnings	9.00c.	10.00c.
Lead, heavy	5.25c.	5.625c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.625c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	19.75c.
Copper, hot rolled	24.00c.
Copper, cold rolled, 14 oz. and heavier	26.25c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	26.12½c.
Copper	27.00c.
Brass Rods	17.50c.
Brazed Brass Tubes	27.75c.

tions steady and unchanged at 6.32½c., St. Louis, for September and October, and 6.35c., for November. The quotation of the leading interest is unchanged at 6.50c., New York, as the contract price.

Zinc.—Due to a large curtailment last week in ore production in the Joplin district, the tone of the market is considerably stronger. Production of ore for the week ended Saturday, Sept. 22, was estimated at 4500 tons, as against 11,800 tons the week before. Shipments were over 8200 tons, so that stocks of ore were reduced, with the estimated total now standing at about 47,100 tons. Some business in prime Western zinc is reported each day, but the market is not particularly active. Prices are evidently stabilized at 6.25c., East St. Louis, or 6.60c., New York. Ore prices are unchanged at $40, Joplin.

Antimony.—Because of very small August-September shipments from China and also because of heavy buying by dealers, Chinese metal is higher at 11c. to 11.25c., New York, duty paid, for spot and 10.75c. and up for futures. There is a stronger attitude among sellers.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Sept. 25.—Sales are moderately active in a market in which prices for tin and lead are higher. Prices for old metals are steady.

Prices, per lb., in carload lots: Lake copper, 15.25c.; tin, 49.50c.; lead, 6.45c.; zinc, 6.35c. in less-than-carload lots; antimony, 12c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Fabricated Structural Steel

Awards of 30,000 Tons—New Projects at 10,300 Tons Are Lowest in Several Months

AWARDS reported during the week amounted to 30,000 tons, the largest having been a railroad bridge at Toledo, Ohio, calling for 4500 tons. The total of new projects was only 10,300 tons, one of the lowest figures of the year. Awards follow:

BOSTON, 200 tons, bridge across River Street, to Boston Bridge Works, Inc.

BOSTON, 162 tons, stores and offices on Washington Street, to New England Structural Co.

BOSTON, 125 tons, office building on Newbury Street, to A. L. Smith Iron Works, Inc.

STATE OF VERMONT, 150 tons, highway bridge, to American Bridge Co.

BRISTOL, CONN., 300 tons, factory building for New Departure Mfg. Co., to Berlin Construction Co., Inc.

NEW YORK, 2200 tons, Doctors' Hospital at Eighty-seventh Street and East End Avenue, to Hedden Iron Construction Co.

NEW YORK, 2100 tons, apartment building at 1001 Park Avenue, to Hedden Iron Construction Co.

NEW YORK, 1800 tons, store building at 721 Fifth Avenue, to A. E. Norton, Inc.

NEW YORK, 700 tons, widening of Park Avenue between Fifty-seventh and Seventy-second Streets, to Phoenix Bridge Co.

ITHACA, N. Y., 650 tons, Plant Industries Building for Cornell University, to Kellogg Structural Steel Co.

STANDARD OIL CO. OF NEW JERSEY, 1000 tons, several tanks in Texas, to unnamed local fabricators.

CARNEYS POINT, N. J., 125 tons, for Du Pont Engineering Co., to American Bridge Co.

BELLE, W. VA., 130 tons, power station for Du Pont Engineering Co., to Virginia Bridge & Iron Co.

MORGANTOWN, W. VA., 575 tons, South Park bridge, to McClintic-Marshall Co.

WASHINGTON, 700 tons, building for Daughters of American Revolution, to Barber & Ross.

WASHINGTON, 270 tons, Main Street bridge, to unnamed fabricator.

MONTGOMERY, ALA., 150 tons, high school, to Ingalls Iron Works Co.

HARRISBURG, PA., 350 tons, 23 State Highway Department machinery storage buildings, to Blaw-Knox Co.

PITTSBURGH, 3200 tons, 20 coal barges for Crucible Fuel Co.; 12 barges, 1920 tons, to American Bridge Co.; 8 barges, 1280 tons, to Jones & Laughlin Steel Corporation.

FORD CITY, PA., 450 tons, extensions for Pittsburgh Plate Glass Co., to McClintic-Marshall Co.

BUFFALO, 1150 tons, Bliss & Laughlin plant, to Lackawanna Steel Construction Co.

BUFFALO, 200 tons, addition for Houde Engineering Co., to R. S. McMannus Steel Construction Co.

LANSING, MICH., 120 tons, viaduct; from Jarvis Engineering Co., general contractor, to Massillon Bridge & Structural Co.

LOCKLAND, OHIO, 1000 tons, building for Tennessee Copper & Chemical Co., to unnamed fabricator.

TOLEDO, OHIO, 4500 tons, Maumee River Bridge for Toledo Terminal Railroad Co., to American Bridge Co.

CINCINNATI, 175 tons, building for Cincinnati Sheet Metal Roofing Co., to Southern Ohio Iron Works.

SOUTH BEND, IND., 900 tons, machine shop, to Indiana Bridge Co.

NEW YORK CENTRAL RAILROAD, 150 tons, bridge at Kankakee, Ill., to Mount Vernon Bridge Co.

STATE OF ILLINOIS, 750 tons, armory for 124th Illinois Artillery, to Mississippi Valley Structural Steel Co.

CHICAGO, 170 tons, addition to building at 123 West Madison Street, to Wendnagel & Co., local.

CHICAGO, 230 tons, warehouse for Central Steel & Wire Co., to Reuter Brothers, local.

CHICAGO, 1040 tons, building for University of Chicago, to Lakeside Bridge & Steel Co.

CHICAGO, 1760 tons, two junior high schools, to unnamed bidder.

MONSANTO, ILL., 450 tons, chemical plant, to American Bridge Co.

MILWAUKEE, 250 tons, building No. 33 for International Harvester Co., to Lakeside Bridge & Steel Co.

ST. PAUL, MINN., 500 tons, addition to Selms-Stemble plant, to Minneapolis Steel & Machinery Co.

EAST ST. LOUIS, ILL., 400 tons, electrolytic zinc plant for Evans-Wallower Zinc Co., to American Bridge Co.

SCHALL, ARK., 900 tons, building for Arkansas Portland Cement Co., to Kansas City Structural Steel Co.

SAN FRANCISCO, 150 tons, apartment building at Laguna and Waller Streets, to Golden Gate Iron Works.

TACOMA, WASH., 175 tons plates, 54-in. welded pipe line, to Steel Tank & Pipe Co.

TULSA, OKLA., 500 tons, Bliss Hotel, to Patterson Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

STATE OF MAINE, 300 tons, highway bridge.

NEW YORK, 500 tons, apartment building at Second Avenue and Twenty-first Street; Schroeder & Koppel, Inc., general contractor.

STATE OF NEW YORK, 700 tons, highway bridges.

HARRISBURG, PA., 400 tons, Zembo Temple.

WASHINGTON, 2500 tons, Government Printing Office.

WASHINGTON, 500 tons, work on Arlington Memorial Bridge.

PHILADELPHIA, 550 tons, Circle Theater, Day & Zimmermann, general contractor.

CLEVELAND, 150 tons, factory building for Gears & Forgings, Inc.

CLEVELAND, 500 tons, plant extensions for Eaton Axle & Spring Co.

JOLIET, ILL., 1750 tons, bridge across Des Planes River for Rock Island Railroad.

CHICAGO, 1550 tons, armory, Mississippi Valley Structural Steel Co., low bidder.

HASTINGS, NEB., 900 tons, dam.

Proposes Research on Strength of Jacketed Vessels

The Boiler Code Committee of the American Society of Mechanical Engineers has recommended to the society's main research committee that an investigation be made into the collapsing strength of jacketed vessels, digesters, enamelled tanks, vacuum stills, and similar vessels. There seems to be no general agreement among engineers on the proper formulas to be used for such designs.

It is realized that extensive experimental work may be required but the main research committee believes that industry will be willing to support an investigation if it has a real need for the information. Accordingly that committee is now circularizing manufacturers and users interested.

PERSONAL

ALONZO F. ALLEN has been appointed secretary and treasurer of the American Steel & Wire Co., Cleveland. He has been secretary and assistant treasurer of the company. His appointment follows the retirement on pension of J. R. THOMAS, treasurer, and the resignation of R.



A. F. ALLEN

R. HAMPSON, assistant treasurer in the company's New York office. Mr. Allen's promotion follows a decision of the company to combine the offices of secretary and treasurer. J. G. NELSON, who has been assistant secretary at Cleveland, has been made assistant secretary and treasurer there; R. S. WHITE has been made assistant secretary and assistant treasurer in New York and C. S. CAWTHORNE has been named to the same positions in Chicago. Mr. Thomas had been connected with the company and its predecessor 43 years. His first position was in the Salem, Ohio, plant, which was operated by the Salem Wire Nail Co. and later taken over by the American Steel & Wire Co.

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Officers elected by the Metals Coating Co. of America, 495 North Third Street, Philadelphia, at a recent directors' meeting were RICHARD L. BINDER, president; GEORGE RUCK and RUDOLPH H. SCHROEDER, vice-presidents; E. WARING WILSON, treasurer, and JOSEPH C. MERKEL, secretary.

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JOSEPH J. BEEMAN has been appointed district engineer and sales representative in Michigan for the Despatch Oven Co., Minneapolis, with headquarters at 4037 Blaine Avenue, Detroit, and will be in charge of sales of the company's small industrial ovens and its large continuous conveyor ovens. J. G. PARKER has been named to serve the company in a similar capacity in western New York, and will have headquarters at 333 Jackson Building, Buffalo.

J. W. SPENCER, JR., for a number of years identified with the New York office of the Ross Heater & Mfg. Co., Inc., Buffalo, has been placed in charge of a new branch office which the company has opened at 121 North Broad Street, Philadelphia.

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H. D. ROSENKRANS has been appointed district manager of a new office which has been opened at 50 Church Street, New York, by the Niagara Machine & Tool Works, Buffalo, to serve the metropolitan New York territory. He has been associated with the company for nine years and has served in the engineering, advertising and sales departments. The company manufactures machines and tools for sheet metal working.

—

E. J. PHILLIPS, who has been identified with the Detroit sales organization of the Van Dorn Electric Tool Co., Cleveland, has been transferred to San Francisco and will be succeeded in the Michigan territory by his brother, GEORGE PHILLIPS. J. F. SPAULDING has been placed in the Van Dorn Baltimore office to succeed JACK BEGGS, who has been removed to the company headquarters at Cleveland.

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HAL F. WRIGHT has been appointed assistant to the general manager of sales for the American Chain Co., Inc., and associated companies, Bridgeport, Conn.

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Dr. C. L. MANTELL, consulting chemical engineer, has returned to the department of chemical engineering at Pratt Institute, Brooklyn, for the school year, after having served as assistant editor of *Chemical and Metallurgical Engineering* during the summer months.

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J. E. SULLIVAN, former superintendent of last furnaces and ore docks at the Sparrows Point plant, Bethlehem Steel Co., has been made vice-president of Edgar E. Brosius, Inc., engineer, Pittsburgh.

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HARRY SAXER, who has been superintendent of blast furnaces at the Aliquippa works, Jones & Laughlin Steel Corporation, has been promoted to assistant general superintendent of that works, succeeding GRENVILLE LEWIS, resigned. Mr. Saxer has been succeeded by R. A. FIELD, who has been assistant superintendent of blast furnaces at Aliquippa. Mr. Saxer has been identified with the company for 20 years, for five years at the Eliza furnaces, Pittsburgh, and for the remainder at the Aliquippa furnaces, first as assistant superintendent and then as superintendent. In the latter position he was largely responsible for the changes in the lines of the Aliquippa furnaces which added materially to their capacities and in the case of No. 5 furnace to its setting several new high production records. In March this year that furnace produced 30,287 gross tons of pig iron, a daily average of 977 tons, and lately it has been averaging more than 1000 tons daily. He is a charter member of the Eastern States Blast Furnace and Coke Oven Association and has taken an active part in its affairs.

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CLYDE H. TENEYCK, for a number of years in the operating department of the Illinois Steel Co., Chicago, has resigned to become associated in an executive capacity with Bliss & Laughlin, Inc., Harvey, Ill., manufacturer of cold-rolled steel bars and shafting. Mr. TenEyck has been identified with the steel industry for 20 years.

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FRANK B. PARKER, general manager of Briggs & Turivas, Inc., dealer in scrap iron and steel and iron and steel products, Blue Island, Ill., has been made vice-president and general manager of the company.

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H. E. STOCKER has joined the Chicago sales organization of the Hendey Machine Co., Torrington, Conn.

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B. E. KIBBEE, vice-president in charge of sales for the Sharon Steel Hoop Co., Sharon, Pa., has been elected a director of the company.

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WILLIAM M. CORSE, consulting metallurgical engineer, Washington, spoke on "Development of Business Through Research," at the annual sales convention of the Hanson-Van Winkle-Munning Co., Matawan, N. J., manufacturer of electroplating and polishing equipment and supplies, which was held Sept. 11 to 15 at Asbury Park, N. J. FREDERICK G. SPACE, purchasing agent Seymour Mfg. Co., Seymour, Conn., spoke on "Sales Ethics," and L. C. MORROW, managing editor *American Machinist*, New York, on "The Increasing Interest in Metal Finishing." In the closing address VAN WINKLE TODD, president of the New Jersey company, predicted a continuance of prosperity in the plating industry.

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J. C. WILLIAMS, vice-president and general manager Weirton Steel Co., Weirton, W. Va., has returned from a two months' European tour.

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C. EDWIN CLARK, who has been superintendent of the mechanical department at the Lackawanna, N. Y., plant, Bethlehem Steel Co., has been made assistant general manager of the company's Sparrows Point, Md., plant.

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WALTER BLOCK and A. D. FIELDS, formerly with the consulting engineering firm of Clark, MacMullen & Riley, Inc., New York, have opened offices as consulting engineers at 17 East Forty-fifth Street, New York, and will specialize in industrial plant design and equipment.

OBITUARY

PAUL ARMSTRONG, president and one of the founders of the Armstrong Brothers Tool Co. and Armstrong-Blum Mfg. Co., Chicago, died at his home at River Forest, Ill., on Sept. 20, in his sixty-sixth year. He had



PAUL ARMSTRONG

been in failing health for several months. He was born at Perth, Scotland, and came to this country at the age of three, when his parents made Chicago their home. In 1893 with his brothers, John, Hugh and James, he founded the Armstrong Brothers Tool Co. for the manufacture of machinists' tools. It has been said that Paul Armstrong was more largely responsible than any other man for the universal adoption of the tool holder system in the use of machine tools.

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HENRY C. BANDAU, one of the founders and for several years president of the Kohver Pattern Co., Milwaukee, died Sept. 16, following a paralytic stroke. He was 51 years of age and had lived in Milwaukee since 1903.

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WILLIAM J. BRYSON, retired civil engineer and a member of the board of directors of James B. Clow & Sons, Chicago, died Sept. 16 at Lake Placid, N. Y. His first employment was with the United States Government in 1865 as an engineer on fortifications near Washington. For a number of years until 1900 he was assistant engineer for the Chicago & Alton Railroad.

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HENRY S. LYONS, president of the Mystic Steamship Co. and vice-president of the Massachusetts Gas Companies, Boston, died of pneumonia in New York on Sept. 21.

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WALTER C. ARTHURS, since 1908 president Mount Vernon Car Mfg. Co., Mount Vernon, Ill., died suddenly while nearing that city on his return with his family from a summer vacation at Hackensack, Minn. He was born at Hillsboro, Ill., 63 years ago, but had lived in Mount Vernon ever since the car company was established in 1890.

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DAVID AHLDIN, since 1924 engineer in charge of acetylene installations for the Keith Dunham Co., Chicago, and one of the outstanding figures in the acetylene industry in the United States, died suddenly on Sept. 6. He was born at Stockholm, Sweden, in 1880, and was graduated from the Swedish Naval Academy. He first began to devote his attention to the use of acetylene when employed by the De Laval company and the Swedish Gas Accumulator Co. in Sweden, and while associated with the latter company, he made his first trip to the United States in 1910. In this country he became identified with the American Gas Accumulator Co. and in 1911 was made chief engineer of the Commercial Acetylene Supply Co., New York, holding that position until 1924.

—

JOSEPH R. DILWORTH, president Dilworth, Porter & Co., Pittsburgh, manufacturers of railroad supplies, died at his summer home at Southampton, N. Y., on Sept. 21, aged 68 years. He was born in Pittsburgh, but had lived in New York for a number of years.

—

FRED M. JOHNSON, general manager Brammer Washing Machine Co., Davenport, Iowa, died on Sept. 14.

—

FRED W. SYKES, for 27 years in charge of the Lake Street, Chicago, warehouse of the American Steel & Wire Co., died Sept. 21 following an attack of acute indigestion. He would have been 60 years old next April. Before taking charge of the warehouse he was employed by the Illinois Steel Co.

Reinforcing Steel

Iowa Road Work Calls for 9000 Tons

HIGHWAY work in Iowa, calling for 9000 tons, brought the total of new projects reported during the week to 12,000 tons. The following awards, totaling 5400 tons, included no jobs of outstanding size:

BOSTON, 175 tons, Boston & Maine Railroad baggage terminal, to Concrete Steel Co.

NEW YORK, 400 tons, subway section 2, route 106; from La Rocca Construction Co., general contractor, to Fireproof Products Co.

BROOKLYN, 550 tons, building for Brooklyn Ash Removal Co., Inc., to McClintic-Marshall Co.

BROOKLYN, 300 tons, foundation work for Abraham & Strauss department store building, to Concrete Steel Co.

JAMAICA, N. Y., 110 tons, Suffolk Title & Guaranty building, to Carroll-McCreary Co., Inc.

NEWARK, N. J., 200 tons, substation for Public Service Production Co., to Joseph T. Ryerson & Son, Inc.

NEWARK, 120 tons, Essex County Vocation School, to Tidewater Structural Materials Corporation.

STATE OF NEW JERSEY, 150 tons, road work, to Concrete Steel Co.

STATE OF NEW JERSEY, 200 tons, road work near Riverton; from Cizzienti Brothers, general contractors, to Taylor-Davis Co., Philadelphia.

NEW BRUNSWICK, N. J., 150 tons, distributing station for Public Service Production Co., to Igoe Brothers.

CLEVELAND, 600 tons, Nickel Plate Railroad grade crossing elimination work, to Pattison Leitch Co.

CHICAGO, 260 tons of rail steel bars, apartment building on Winthrop Avenue, to Calumet Steel Co.

CHICAGO, 100 tons of rail steel bars, Rockeby Apartments, to Concrete Engineering Co.

CHICAGO, 200 tons, addition to Victory Mfg. Co. plant, to unnamed bidder.

CHICAGO, 100 tons, building for Peoples' Furniture Co., to Concrete Engineering Co.

CHICAGO, 120 tons, apartment building on Oakdale Avenue, to Concrete Engineering Co.

CHICAGO, 165 tons, garage, to Barton Spiderweb System, Inc.

MOLINE, ILL., 500 tons of rail steel bars, building for Deere & Co., to Republic Iron & Steel Co.

NORTH PLATTE, NEB., tonnage unstated, building for Swift & Co., to Concrete Engineering Co.

EAST ST. LOUIS, ILL., 100 tons, electrolytic zinc plant for Evans-Wallower Zinc Co., to Laclede Steel Co.

ST. LOUIS, 325 tons, hotel and office building at Twelfth Boulevard and Olive Street, to Missouri Rolling Mill Corporation.

SAN FRANCISCO, 200 tons, Simmons Bed Co. plant, to Pacific Coast Steel Co.

LOS ANGELES, 130 tons, club building, South Los Angeles Street, to unnamed company.

LOS ANGELES, 390 tons, apartment building, Ocean View Avenue, to unnamed company.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 500 tons, foundation work on Kill Van Kull Bridge; Converse Construction Co., general contractor.

NEW YORK, 185 tons, addition to Evander Childs High School; bids opened Sept. 25.

BROOKLYN, 400 tons, building for Brooklyn Ash Removal Co., Inc.

CHICAGO, tonnage not stated, two junior high schools; Thorgerson & Erickson, low bidder on general contracts.

CHICAGO, 200 tons, building for Commonwealth Edison Co.; MacDowell Construction Co., low bidder.

CHICAGO, 370 tons, armory; Great Lakes Construction Co., low bidder.

STATE OF IOWA, 9000 tons, highway work.

OAKLAND, CAL., 140 tons, office building, Fourteenth and Franklin Streets; bids being taken.

SAN FRANCISCO, 170 tons, apartment building, 2160 Pacific Street; bids being taken.

SAN FRANCISCO, 190 tons, apartment building, Chestnut and Larkin Streets; bids being taken.

SAN FRANCISCO, 525 tons, Bernal Cut project; bids opened.

SANTA CRUZ, CAL., 225 tons, hotel; bids opened.

Tin Plate Plan Divides Foreign Fields

Welsh-American Agreement Sets Quotas for Canada, South America and Italy—British Advance Export Ferromanganese Price

(*By Cable*)

LONDON, ENGLAND, Sept. 24.

THE Welsh-United States tin plate agreement, ratified last week, is now understood to concern only sales to Canada, South America and Italy, parts of which markets are to be reserved for United States mills, all other markets to be free. The United States must not exceed a 30 per cent quota for exports.

Cleveland pig iron is still quiet, but the outlook is regarded more favorable. Domestic purchasing is for delivery up to one month only, because of the uncertainty about the new railroad rates effective in December. Export inquiry is increasing.

Bolckow, Vaughan & Co. have blown out one furnace producing foundry grade and blown in a furnace on ferromanganese. Hematite iron is improving with quotations steadier as stocks have diminished.

Ferromanganese prices have been advanced for export as a result of improved Continental demand. Canada has bought 1500 tons of spiegeleisen, which was shipped from Tees last week. Foreign ore is quiet and Bilbao Rubio prices are unchanged.

Domestic demand for finished steel is moderately active except in shipbuilding material. Export demand is increasing slowly with India especially interested in buying.

Galvanized sheets are active and demand for black sheets is better, particularly in light gages for Japan, on which mills are fully sold for some time.

Continental markets are strong with a sustained demand from overseas and British users are buying sparingly because of the advancing tendency of the market. The International Steel Cartel meets again Dec. 13. The International Tube Cartel met at Vienna, Sept. 21 and 22.

German pig iron output in August was 1,031,000 metric tons. Luxemburg production in July was 233,500 tons of pig iron and 224,000 metric tons of steel. Polish output in July was 56,000 tons of pig iron and 122.000 tons of steel.

Tin plate is moderately active, with makers enthusiastic about the future. Tin plate bar makers are engaged on heavy bookings and considering an advance in prices.

French Exports Decrease

Domestic Demand Heavy and Mills Are Well Filled—Export Information Bureau Advocated

PARIS, FRANCE, Sept. 11.—Increased domestic requirements for iron and steel are reflected in the smaller export total for July, which showed only 153,116 tons of iron and steel products shipped out of the country compared with 201,518 tons in June. Production of 757,000 metric tons in July was about 40,000 tons less than in the previous month. Prices continue strong, with the domestic market still advancing. At present there is discussion of the possibility of establishing a publicity office to promote new uses of steel in France. There is also a movement for the establishment of an export bureau for the mechanical trades, which would act as an information center in promoting exports of French iron and steel.

Pig Iron.—Demand is satisfactory, and at the next meeting of producers and consumers of phosphoric foundry iron it is expected that a large tonnage will be set aside in October for domestic users, with prices unchanged. The entente of French, Belgian and Luxemburg producers of pig iron has advanced the price of phosphoric foundry iron for Belgian consumers by 5 fr. (20c.) per metric ton, bringing it to 595 Belgian francs ($23.20), f.o.b. Athus or Sterpeniche. Very little competition from Dutch hematite iron is reported in the North, except for a few shipments entered under the "temporary admission" agreement. Exports of pig iron were 51,797 tons in July and imports 2857 tons, compared with 39,876 tons of exports and 7555 of imports in June.

Semi-Finished Material.—Export prices are firmer, with blooms at £4 15s. to £4 16s. ($23.09 to $23.33) per metric ton, f.o.b. Antwerp, billets at £4 17s. 6d. to £4 18s. 6d. ($23.69 to $24.06), f.o.b. Antwerp.

Finished Material.—Merchant prod-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. maker works, with American equivalent figured at $4.86 per £ as follows:

Durham coke, del'd	£0	17½s.				$4.25	
Bilbao Rubio ore*	1	2	to £1	2½s.		5.35 to	$5.48
Cleveland No. 1 fdy	3	8½	to 3	9½		16.64 to	16.89
Cleveland No. 3 fdy	3	6				16.04	
Cleveland No. 4 fdy	3	5				15.80	
Cleveland No. 4 forge	3	4½				15.68	
Cleveland basic (nom.)	3	5				15.80	
East Coast mixed	3	10				17.11	
East Coast hematite	3	10½				17.23	
Rails, 60 lb. and up	7	15	to 8	5		37.66 to	40.10
Billets	6	2½	to 6	15		29.77 to	32.81
Ferromanganese	13	15				66.83	
Ferromanganese (export)	14	0				68.04	
Sheet and tin plate bars, Welsh	6	0				29.16	
Tin plate, base box	0	18	to 0	18¼		4.37 to	4.43
Black sheets, Japanese specifications	13	7½				65.00	
						C. per Lb.	
Ship plates	7	12½	to 8	2½		1.63 to	1.74
Boiler plates	9	0	to 10	10		1.92 to	2.25
Tees	8	2½	to 8	12½		1.74 to	1.84
Channels	7	7½	to 7	17½		1.58 to	1.69
Beams	7	2½	to 7	12½		1.53 to	1.63
Round bars, ¾ to 3 in.	7	5	to 7	15		1.55 to	1.66
Steel hoops	9	0	to 10	0		1.92 to	2.14
Black sheets, 24 gage	9	15	to 10	0		2.09 to	2.14
Galv. sheets, 24 gage	13	10	to 13	12½		2.93 to	2.99
Cold rolled steel strip, 20 gage, nom.	16	0				3.42	

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):							
Belgium	£3	3s.	to £3	5s.		$15.32 to	$15.80
France	3	3	to 3	5		15.32 to	15.80
Luxemburg	3	3	to 3	5		15.32 to	15.80
Basic pig iron (nom.):							
Belgium	3	3	to 3	4		15.41 to	16.38
France	3	3	to 3	4		15.41 to	16.38
Luxemburg	3	3	to 3	4		15.41 to	16.38
Coke	0	18				4.37	
Billets:							
Belgium	5	0				24.30	
France	5	0				24.30	
Merchant bars:						C. per Lb.	
Belgium	6	5				1.37	
France	6	5				1.37	
Luxemburg	6	5				1.37	
Joists (beams):							
Belgium	5	5				1.14	
France	5	5				1.14	
Luxemburg	5	5				1.14	
Angles:							
Belgium	6	0				1.30	
¼-in. plate:							
Belgium (a)	6	15				1.50	
Germany (a)	6	15				1.50	
⅜-in. ship plate:							
Belgium	6	10				1.44	
Luxemburg	6	10				1.44	
Sheets, heavy:							
Belgium	6	1				1.33	
Germany	6	1				1.33	

(a) Nominal.

ucts continue to advance, and most mills are unable to offer shipment in less than three months. On certain sizes of shapes deliveries are four to five months. Steel bars are quoted on the Brussels Bourse at £6 2s. to £6 2s. 6d. per ton (1.35c. to 1.36c. per lb.), f.o.b. Antwerp, and normal specifications of beams range from £4 18s. to £4 18s. 6d. per ton (1.08c. to 1.09c. per lb.), with British specifications at £4 19s. to £4 19s. 6d. (1.09c. to 1.10c. per lb.) per ton, Antwerp. Export prices on sheets are firm at £6 9s. per ton (1.42c. per lb.) for 6 mm., and at £6 12s. per ton (1.46c. per lb.), Antwerp, for 3 mm. In the domestic market sheets are strong in the lighter gages. Mills are quoting five to six weeks' delivery on plates and medium-gage sheets, and there is a substantial volume of inquiry. Deliveries on the lighter gages extend to two months or more, with prices tending to advance. Total exports of sheets in July were 14,286 tons, compared with 17,820 tons in June, while imports were 445 tons in July and 440 tons in June.

Rails.—The next meeting of the European Rail Makers Association is scheduled to be held in Paris, Sept. 21. French exports of rails in July totaled 42,416 tons, of which 12,656 tons went to Germany. Only 32,193 tons of rails were exported in June.

Rail production, as shown in the table, covers 12 to 100-lb. sections in the case of the Government Works and mostly sections less than 20 lb. by the privately owned companies. Imports included a wide range of rail sections, but 40 per cent of the total was in 100-lb. and heavier rails. Of the total steel produced in Japan and imported during 1927, importations represented about 36 per cent. Only in pipe, wire rods and I-beams did the imports exceed the domestic output. In the case of round steel bars imports represented only about 14 per cent of the total sold in the country, while in sheets imports were about 40 per cent of the total.

Prices of Imported Steel High

Recent quotations on Continental steel obtained by importers in New York have been close to 2c. per lb., duty paid, Atlantic port, on Thomas grade steel bars and 1.83c. to 1.88c. per lb., duty paid, on structural material. At these prices it is practically impossible to do business with American consumers. But foreign steel is still being sold, as occasionally importers find a mill in France, Belgium or Germany willing to accept certain sizes to complete a rolling, at slightly less than the usual quotations.

Japanese Steel Output Greater

More Than Half of Domestic Needs Furnished in Most Products—Tin Plate Order Goes to American Mills

NEW YORK, Sept. 25.—Export trade with the Far East is beginning to improve, but purchases from both China and Japan are limited to small lots, except in the case of large companies covering their usual requirements. One such purchase, 60,000 base boxes of tin plate, 14 x 18¾-in. and 10 x 20-in., was made last week by the Nippon Oil Co. from two large Japanese trading companies. The order is understood to have been distributed equally among five American mills. No inquiry for light-gage black sheets is reported here, but this is not considered unusual, as the leading Japanese maker, the Kawasaki Dockyard Co., Kobe, is reported to have a considerable supply of sheets in stock.

Latest Japanese reports on production and importation of steel products indicate that in most cases Japan is producing a large part of the country's requirements. The total production of steel in Japan by the Government Works and privately owned mills during 1927 was 1,277,826 metric tons. Adding 731,109 metric tons of imported steel, the total estimated consumption in Japan was 2,008,935 metric tons. The following table gives the output, in metric tons, of the Government Works and private interests, and the imports for 1927:

	Production			
	Government Works	Private Plants	Imports	Total
Sheets	161,928	168,582	224,955	555,465
Tin plate...	14,706	.....	61,052	75,758
Rails	165,950	4,139	88,854	258,943
Bars:				
Round ..	102,275	237,686	57,230	397,191
Square ..	19,860	9,435	6,983	36,278
Flat	37,584	29,979	19,152	86.715
Angles (equal) ..	66,093	60,862	26,227	153,182
Angles (unequal) ..	28,399	4,393	11,966	44,958
Channels ..	32,772	.....	26,096	58,868
I-beams ...	15,491	.....	36,495	51.986
Wire rods..	49,032	5,395	109,090	163,517
Pipe	.....	47,777	52,003	99,780
Carwheels .	7,638	11,215	796	19,649
Total, all products	698,363	579,463	731,109	2,008,935

Krupp Works Building Steel Mills for Japan

HAMBURG, GERMANY, Sept. 11.—According to a recent report, Friedrich Krupp A. G., through its Grusonwerk at Magdeburg, has received an order from the Kawasaki Dockyard Co., Kobe, Japan, for rolling mill equipment to produce sheets of No. 22 gage and lighter. The Krupp works will ship a rail mill of 35,000 tons annual capacity to the Government Steel Works at Yawata, Japan, some time next month.

Formation of Sheet Cartel Considered in Germany

HAMBURG, GERMANY, Sept. 10.—Negotiations have been resumed among steel sheet producers for the formation of a sheet syndicate, and the two principal producers, Otto Wolff & Co., Cologne, and Wolff, Netter & Jacobi, Hausach, South Germany, are understood to have reached an agreement.

The sheet industry is apparently facing the need of some control such as might be exercised by a syndicate, as at present No. 20 gage sheets are selling at lower prices than plates. Sheets of this gage are quoted to domestic consumers at about 158 m. ($37.64) per ton, whereas the lowest quotation on plates is 160 m. ($38.71) per ton.

Another unusual condition in the sheet market is the level of export prices, which are higher than domestic instead of being 15 to 25 per cent lower as in the case of other products. For export, No. 25 gage sheets are quoted at £10 17s. 6d. to £11 ($52.85 to $53.46) per ton, f.o.b. port, whereas prices to domestic consumers range from 195 to 198 m. ($46.45 to $47.16) per metric ton.

German Machine Builders Open Paris Office

PARIS, FRANCE, Sept. 11.—The Syndicate of German Machine Tool Manufacturers has decided to establish an office in Paris to handle the large orders being placed with them on reparations account. Negotiations are reported to have been opened with several large French automobile manufacturers, which may result in contracts for German machine tools amounting to several million francs, with credit terms of three to 10 years.

It is reported by the French General Post Office that a bill is to be introduced in the Chamber of Deputies calling for the construction of 200 steel railroad mail cars, 20 meters long, all to be delivered before the end of 1929. Of the total purchase, 100 will be placed with French builders and the remainder with Germany on reparations account.

"Production of High Alumina Slags in the Blast Furnace" is the title of Technical Paper No. 425 of the United States Bureau of Mines by T. L. Joseph, S. P. Kinney and C. E. Wood. The 32-page pamphlet gives the results of 10 years of investigations conducted under a cooperative agreement between the Aluminum Co. of America and the University of Minnesota School of Mines' Experiment Station.

Machinery Markets and News of the Works

Machinery Industry Active

Plants Operating at High Rate on Unfilled Orders and Outlook Continues Very Satisfactory

MACHINE tool trade developments continue highly favorable. Reports vary as to whether September volume will equal that of August. Some sellers have enjoyed an increased business, while others have had less. But taking into account the high rate at which many machine tool plants are operating, the large amount of unfilled business and the steady volume of orders and inquiries, a slight fluctuation downward this month need not be seriously regarded.

Some plants are not only working the full daylight schedule, but are doing some night work. The orders on hand, plus the present volume of new business, are sufficient to maintain this rate during the remainder of the year. Nothing short of a decided slump in orders next month can prevent a very satisfactory fourth quarter. And no such falling off in buying is yet in sight.

A substantial volume of recent business in the Central States has come from the automotive industry, the widespread buying in that field being attributed to changes in models and the imperative need of reducing manufacturing costs to meet competition. Other sources of new business are the oil companies in the Southwest and the aviation industry.

The Eaton Axle & Spring Co., Cleveland, is in the market for special milling and grinding machinery and miscellaneous shop equipment for a large plant extension. It is reported in Chicago that the Ford company is planning to resume the manufacture of tractors at Fordson, Mich., and may buy equipment. The Allis-Chalmers Mfg. Co. is negotiating for equipment for its West Allis, Wis., plant. It has recently completed purchases for its tractor plant at Springfield, Ill.

Among the principal buyers in the East are the General Electric Co., Schenectady; North East Electric Co., Rochester, and Pratt & Whitney Aircraft Co., Hartford.

New York

NEW YORK, Sept. 25.—Among the buyers of machine tools in the last week were the General Electric Co., Schenectady; the North East Electric Co., Rochester, N. Y., and the Pratt & Whitney Aircraft Co., Hartford, Conn. R. Hoe & Co., New York, printing press manufacturers, bought a large Ingersoll milling machine and are expected to close shortly on about eight planers, some of large size. The volume of business so far this month has been equal to that of August, and some sellers report that their sales are running ahead of last month's. Developments of the past week indicated, as have those of previous weeks, that machine tool buying is on a steady, healthy basis and that the present volume of activity may be expected to continue throughout the fall.

Niles-Bement-Pond Co. reports sales of a 48 x 48-in. x 16-ft. Time Saver planer, 6-ft. radial drill, three 36-44-in. side-head boring mills, one eBment 2500-lb. steam hammer, two heavy-duty axle lathes, a Racine saw and a Cincinnati high-speed tapping machine. Pratt & Whitney division sold three vertical shapers, a deep-hole drilling machine, seven 1 x 18-in. automatic lathes, production hand milling machine. rotary surface grinder and 16 x 60-in. lathe.

Contract has been let by General Cable Co., 420 Lexington Avenue, New York, to Doullut & Erwin, Inc., Meaher Building, Mobile, Ala., for one-story wire and cable mill, 120 x 540 ft., at Mobile, to cost more than $500,000 with equipment.

A. J. Schwarzler, 367 East 167th Street, New York, has had plans drawn for a three-story ice-manufacturing plant, to cost about $150,000 with equipment. Project will include an automobile service, repair and garage building. Charles Schaefer, 332 East 149th Street, is architect.

American Seal Kap Corporation, Natick, Mass., manufacturer of metal bottle caps, etc., has purchased two factory buildings, 90 x 240 ft., in Long Island City, heretofore occupied by Type Founders Corporation, and will remove to new location.

New York Edison Co., Irving Place and Fifteenth Street, New York, has awarded general contract to Ken Well Construction Co., 45 East Seventeenth Street, for addition to power plant at foot of Fourteenth Street, fronting on East River, to cost approximately $2,000,000. Thomas E. Murray, Inc., 55 Duane Street, is engineer.

Bart and John P. Walther, 103 East 125th Street, New York, architects, have awarded general contract to J. H. Deeves & Brother, 4 East Thirty-ninth Street, for one-story wire annealing works at 539-53 East 118th Street, for a company whose name is temporarily withheld, to cost about $40,000 with equipment.

Empire Oil & Refining Co., 60 Wall Street, New York, operated by Cities Service Co., same address, is planning new oil refinery in eastern Iowa, with initial capacity of 10,000 bbl., to be increased later to 20,000 bbl. Project will include construction of 10-in. steel pipe line from Augusta, Kan., to refinery, with booster station facilities for capacity of 40,000 bbl. daily. Development is reported to cost more than $1,000,000.

Following merger of Direct Control Valve Co., 101 Park Avenue, New York, and Lawler Water Feed & Damper Regulator Co., Mount Vernon, N. Y., under first noted name, arrangements have been made for a stock issue to total $750,000, portion of proceeds to be used for expansion, including development of plant of Milwaukee Valve Co., Milwaukee, a subsidiary, where production will be largely concentrated.

Andrew J. Thomas, 2 West Forty-sixth Street, New York, architect, has plans for two-story addition, 75 x 200 ft., to automobile service, repair and garage building at 335 East Forty-seventh Street, including improvements in present building, to cost about $110,000.

Ovens, power equipment, conveying and other machinery will be installed in new three-story and basement plant to be erected by General Baking Co., 420 Lexington Avenue, New York, at Norfolk, Va., to cost over $125,000. C. B. Comstock, 110 West Fortieth Street, New York, is architect and engineer.

Texas Corporation, 17 Battery Place, New York, is planning extensions in oil refinery at Lockport, Ill., to increase capacity from 7500 to 15,000 bbl. per day. A trunk pipe line will be constructed from vicinity of Tulsa, Okla., to refinery site. Company is also planning to enlarge capacity of three refineries in Texas and one in Wyoming, including additional connections with pipe line system. Entire project is reported to cost over $2,000,000 with equipment.

Clarence D. Chamberlin, technical advisor and director of Crescent Aircraft Corporation, Lindenhurst, L. I., has purchased factory property at Jersey City, N. J., totaling 10 acres of land, with buildings aggregating 120,000 sq. ft. floor space, and will remodel for manufacture

The Crane Market

BUSINESS in overhead electric cranes continues rather limited with only a small volume of new inquiry and buyers slow to place orders. Although the locomotive crane field is quiet at present, subway contracts not yet awarded and a water supply tunnel contract from Yonkers, N. Y., to Brooklyn are expected by sellers to provide some new contractors' requirements in cranes and shovels. Among the contractors who may have equipment requirements in connection with subway construction are La Rocca Construction Corporation, Rosenthal Engineering Contracting Co., and D. C. Serber, Inc., all in New York. The Colonial Sand & Gravel Co., New York, is reported to have closed on a crawl-tread locomotive crane.

Among recent purchases are:

Steel Company of Canada, Ltd., Hamilton, Ontario, two 175-ton ladle cranes and one charging machine from Morgan Engineering Co.

Youngstown Sheet & Tube Co., Youngstown, 40-ton, 85-ft. span mill crane from Morgan Engineering Co.

Century Electric Co., St. Louis, 10-ton, 76-ft. span, overhead electric crane from Manning, Maxwell & Moore, Inc.

of airplanes and parts. Chamberlin Aeronautical Corporation, recently organized, and Crescent company will occupy plant jointly, each developing manufacture of different types of aircraft. It is understood that works at Lindenhurst will be removed to new location.

Board of Education, New Milford, N. J., plans installation of manual training equipment in new three-story high school to cost $400,000, for which bids have been asked on general contract. Ernest Sibley, Bluff Road, Palisade, N. J., is architect.

Lionel Corporation, 605 East Twenty-first Street, Irvington, N. J., manufacturer of electric toys, has plans for new one and two-story plant in Hillside district, 390 x 620 ft., to cost over $200,000 with equipment. Austin Co., New York, is architect and engineer.

Newark Transformer Co., 17 Frelinghuysen Avenue, Newark, manufacturer of electric power equipment, has acquired property at 62 Sherman Avenue, 25 x 100 ft., and plans construction of an addition, to cost about $40,000.

New England

BOSTON, Sept. 25.—Large machine tool users have not been a market factor in months. Business placed with dealers in September has been mainly from Connecticut firms. In the past week $30,000 worth of tools was sold to one company. Small tools continue active.

According to latest reports available from the United States Employment Bureau, Massachusetts metal-working establishments are operating at capacity and certain cities indicate a shortage in high-skilled labor. In Maine, the majority of machine shops are moderately busy and in one section iron works are operating overtime. In Connecticut, metal-working plants in general are working overtime, while in Rhode Island a shortage of high-skilled workmen continues. In Vermont the situation is spotty, but on the whole optimistic. The few New Hampshire metal-working plants are operating, approximately, on a normal basis.

Lyman Gun Sight Corporation, Middlefield, Conn., has plans for extensions. Details will be announced later.

Work has been started on a $40,000,000 hydroelectric plant and dam at Munroe, N. H., and Barnet, Vt., for New England Power Co., Worcester, Mass. Lester W. Branch, St. Johnsbury, Vt., is engineer.

Plans will be ready this week for a $145,000 storage service unit at Middletown, Conn., for Connecticut Power Co., 266 Pearl Street, Hartford. Davis & Walldorff, 17 Whitney Avenue, New Haven, are architects.

Kendall, Taylor & Co., 142 Berkley Street, Boston, architects, close bids Sept. 28 on a $225,000 fire alarm signal headquarters and other fire department improvements, to include, if possible, a small machine shop, for Newton, Mass. Public building commissioner, City Hall annex, will pass on final papers.

Plans will be ready about Oct. 16 for a municipal sewage disposal plant at Fields Point section, Providence, R. I. T. J. Hill Pierce, City Hall, Providence, has plans.

Contract has been let by French Mfg. Co., Waterbury, Conn., manufacturer of bronze and copper tubing, to Torrington Building Co., Torrington, Conn., for one-story addition, 60 x 200 ft., to cost about $50,000 with equipment.

Hygrade Lamp Co., Salem, Mass., manufacturer of incandescent electric lamps, has purchased Vosburgh Miniature Lamp Co., Orange, N. J., specializing in small electric lamp units, and will remove latter works to Salem, where expansion will be carried out. A few months ago, Hygrade company acquired Triumph Lamp Co., Indianapolis, and has consolidated with its organization at Salem.

Gilbert & Bennett Co., Georgetown, Conn., manufacturer of wire cloth, has awarded general contract to H. Wales Lines Co., Meriden, Conn., for a one-story addition for mechanical cleaning. Greenwood & Noerr, 847 Main Street, Hartford, Conn., are engineers.

Goss & De Leeuw Machine Co., New Britain, Conn., manufacturer of chucking machinery and parts, has awarded general contract to Aberthaw Co., Boston, for one-story addition, 100 x 175 ft., to cost about $50,000 with equipment.

H. T. McCluskey & Sons, Inc., 525 Grand Avenue, New Haven, Conn., manufacturer of wire cloth, has awarded general contract to Emil W. Lundstrom, Hamden, Conn., for one-story addition, 42 x 60 ft. Dwight E. Smith, New Haven, is architect.

Board of Works, Springfield, Mass., has taken out a permit for a new pumping station for municipal water system, to cost $90,000 with pumping units and other equipment.

South Atlantic

BALTIMORE, Sept. 25.—Crown Cork & Seal Co., 1511 Guilford Avenue, Baltimore, manufacturer of metal bottle caps, bottle-capping machinery, etc., is having plans completed by L. R. White, Hearst Tower Building, architect, for one and two-story addition, 150 x 600 ft., to cost over $175,000 with equipment. Bids will be asked on general contract in October.

International Harvester Co., 606 South Michigan Avenue, Chicago, has asked bids on general contract for new factory branch, storage and service plant for motor truck division at Baltimore, one story, 125 x 250 ft., to cost over $125,000 with equipment. W. D. Price, company headquarters, is engineer, in charge.

Carolina Power & Light Co., Raleigh, N. C., is disposing of bond issue of $2,500,000, part of proceeds to be used for extensions and improvements in power plants and system.

Board of District Commissioners, District Building, Washington, will receive bids until Oct. 5 for cast iron lamp posts and fittings, including 60 post bases; 50 frames for fire alarm posts; 25 lamp post shafts; 30 frames for police patrol posts.

Franklin Mineral Products Co., Franklin, N. C., John Davenport, general manager, will erect new mica grinding mill, comprising main one-story unit, 30 x 185 ft., with grading plant, 30 x 100 ft., boiler house and other buildings, to cost about $55,000 with machinery.

Medley Mfg. Co., Columbus, Ga., has been organized to take over and expand local plant and business of Tom Huston Mfg. Co., manufacturer of peanut-shelling machinery and kindred equipment.

General Purchasing Officer, Panama Canal, Washington, will receive bids until Oct. 4 for centrifugal pumping units, carwheels, and other equipment, Panama Schedule 1903.

Raymond C. Snow, Bona Allen Building, Atlanta, Ga., architect, has plans for one-story and basement automobile service, repair and garage building, 100 x 165 ft., to cost about $100,000 with equipment.

Merchants' Storage & Refrigeration Co., Baltimore, recently organized by George H. Jarboe, 4001 Frederick Avenue, and associates, has acquired former local plant of Shafer Refrigerating Co., and will remodel for new cold storage and refrigerating unit, including installation of additional equipment.

Board of Education, Winston-Salem, N. C., plans installation of manual training equipment in two new junior high schools, one to be within city limits and other at South Winston-Salem; also in new high school for colored students. New structures will be built in connection with school expansion program to cost $2,500,000, for which bond issue will soon be sold.

Bureau of Yards and Docks, Navy Department, Washington, will receive bids (no closing date announced) for 125-hp. return flue fire box boiler, with fuel oil burner, stack and accessories, for naval air station at San Diego, Cal., specification 5483.

Buffalo

BUFFALO, Sept. 24.—Plans have been filed by Houde Engineering Corporation, 537 East Delavan Avenue, Buffalo, manufacturer of automobile shock absorbers, etc., for one-story plant unit to cost $75,000.

Nichols & O'Connor, Cahill Building, Syracuse, N. Y., architects, have plans for a one-story automobile service, repair and garage building, to cost $140,000 with equipment.

Carborundum Co., Niagara Falls, N. Y., manufacturer of abrasive products, is planning construction of three-story factory branch and distributing plant at Detroit, to cost over $60,000 with equipment.

Department of Correction, Albany, N. Y., is planning construction of new one-story mechanical shop at State prison at Auburn, N. Y.

Cherry-Burrell Corporation, Little Falls, N. Y., has been organized to take over D. H. Burrell & Co., manufacturer of dairy machinery, with local plant, and J. G. Cherry Co., Cedar Rapids, Iowa, maker of similar equipment, as well as Cherry-Bassett Co., a subsidiary of last-noted, John W. Ladd Co., Detroit, Wright-Ziegler Co., Boston, and Milwaukee Dairy Supply Mfg. Co., Milwaukee, all manufacturers of like machinery, including ice cream freezers, etc. Consolidated organization has arranged for bond issue of $2,000,000 to provide for merger and expansion in output.

Board of Contract and Supply, Utica, N. Y., is considering one-story equipment storage and distributing plant, with mechanical department, to cost about $50,000.

Chisholm-Moore Hoist Corporation, recently at Cleveland, removed its general offices to Tonawanda, N. Y., on Sept. 1. Branch office with complete line of hoists will be continued at Cleveland.

Pittsburgh

PITTSBURGH, Sept. 24.—There is still a fairly active inquiry for machine tools in this district and while actual sales leave something to be desired a few firms are well satisfied with recent transactions. One company handling a line of special pipe mill tools has done enough business to consider September a good month.

The Steel Co. of Canada, has distributed orders for ladle cranes, chargers and other steel works equipment through a local consulting engineer and it is expected that the cement mill equipment will soon be placed for the Davison Coke & Iron Co., which recently acquired the Neville furnace of the American Steel & Wire Co. and now is engaged in construction work on a by-product coke plant and power house in addition to the cement works. A large order for power plant equipment for this company recently was placed. In addition to purchases of motors for its blooming and billet and bar mills, the Youngstown Sheet & Tube Co. has bought two compressors for the blooming mill.

Peters Gas Coal Co., Finleyville, near Washington, Pa., is said to be planning to rebuild part of tipple recently destroyed by fire, with loss over $75,000 with equipment.

James H. McQuade & Sons Co., Magee Building, Pittsburgh, contractor, has acquired property, 100 x 130 ft., at Bloomfield, for equipment and machinery storage and distributing plant, with repair facilities.

Parkersburg Rig & Reel Co., Harris Street, Parkersburg, W. Va., manufacturer of oil well machinery, parts, etc., has awarded general contract to Plate Construction Co., 726 Jeanette Street, for one-story addition to cost about $75,000 with equipment.

Continental Refining Co., Oil City, Pa., has plans for a two-story addition to cost about $30,000.

Board of County Commissioners, City-County Building, Pittsburgh, has fund of $1,500,000 for purchase of land and construction of airport, including hangars, service and repair shops, oil storage and other buildings. City Council is arranging to cooperate and will contribute additional fund of about $500,000.

General offices and drafting rooms of Steel Frame House Co., a subsidiary of McClintic-Marshall Co., have been transferred from Leetsdale, Pa., to Oliver Building, Pittsburgh.

Homestead Valve Mfg. Co., Inc., Homestead, Pa., manufacturer of valves and vapor cleaning machines, has purchased plant on Narrows Run Road near Coraopolis, Pa., and will remove factory and offices to new location Oct. 1. Property consists of 108-acre tract with three-story factory building, office building, foundry and additional structures which will be used for pattern shop and storage.

Cleveland

CLEVELAND, Sept. 24.—Machine tool sales were good the past week, showing some gain over the early part of the month. Good sized orders were placed by two or three Michigan automobile companies. There was a fair amount of activity in single machines in the Cleveland territory, largely from manufacturers of automobile parts. The Eaton Axle & Spring Co., Cleveland, is in the market for special milling, grinding and other machinery to equip a plant extension. Machine tool manufacturers are getting quite a little business from the airplane industry, indicating the growing importance of that industry as an outlet for machine tools. Turret lathes are moving in fair volume, although September sales will fall somewhat below those of August.

Eaton Axle & Spring Co., Cleveland, is having plans prepared for a $1,000,000 extension to its East 140th Street plant, providing additional floor space of 120,000 sq. ft.

Superstructure will be started by Hahn Mfg. Co., 5332 Hamilton Avenue, Cleveland, for one-story machine shop, 40 x 73 ft., to cost about $37,000 with equipment.

W. S. Tyler Co., 3600 Superior Avenue, Cleveland, manufacturer of wire cloth, ornamental bronze and iron products, etc., has plans for a five-story addition, 66 x 100 ft., to cost more than $200,000 with equipment.

Goodyear Zeppelin Co., operated by Goodyear Tire & Rubber Co., Akron, Ohio, has secured award from Navy Department, Washington, for construction of two dirigibles, to cost approximately $8,000,000, and contemplates establishment of new plant to carry out project.

General Fire Extinguisher Co., Warren, Ohio, operated by Grinnell Co., Providence, R. I., is said to be arranging for use of part of adjoining plant of Warren Iron & Steel Co., recently acquired, for expansion.

Detroit

DETROIT, Sept. 24.—Contract has been let by Long Mfg. Co., 2768 East Grand Boulevard, Detroit, manufacturer of automobile radiators, clutches, etc., to Edward Chase, Detroit, for a two-story addition, to cost more than $50,000 with equipment. George V. Pottle, David Whitney Building, is architect.

Buick Motor Co., Flint, Mich., has plans for a three-story factory branch, service and repair building at Dallas, Tex., to cost $110,000 with equipment.

Kalamazoo Stationery Co., Harrison Street, Kalamazoo, Mich., has filed plans for a power plant, 50 x 50 ft., to cost $50,000 including equipment.

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, has plans for a one-story addition, 80 x 100 ft., to cost about $40,000 with equipment. Albert Kahn, Marquette Building, is architect and engineer.

Plans have been arranged for a merger of Bennett Pump Corporation, Muskegon, Mich., manufacturer of pumping machinery and parts, and Service Station Equipment Co., Ltd., Toronto, manufacturer of kindred machinery. A holding company will be formed with capital of $6,500,000 to carry out consolidation; each organization will maintain present identity. An expansion program will be carried out. Thomas Bennett will head new company.

Steel & Tubes, Inc., 224 East 131st Street, Cleveland, has awarded a general contract to H. G. Christman Co., Stevens Building, Detroit, for initial unit of new one-story plant, 210 x 500 ft., at Ferndale, Mich.

Clark Equipment Co., Buchanan, Mich., manufacturer of automobile axles, transmissions, metal wheels, etc., is completing work on one-story addition, 180 x 255 ft., at branch plant at Battle Creek, Mich., to be occupied within next 60 days. An office and executive building has been completed at latter works, and space formerly used for such service will be given over to production. Extensions will be made at branch plant at Berrien Springs, Mich.

Detroit Gasket Mfg. Co., 6309 Hamilton Avenue, Detroit, has awarded general contract to J. H. Reidinger Co., 6537 Russell Street, for one and two-story addition, with boiler house, to cost about $75,000 with equipment. C. W. Brandt, 2111 Woodward Avenue, is architect.

Carborundum Co., Niagara Falls, N. Y., manufacturer of abrasive and refractory materials, has broken ground for general warehouse and sales office building at Detroit. It will be three stories and basement, 110 x 250 ft., containing 50,000 sq. ft. of floor space. General contract has been let to Walbridge-Aldinger Co. and erection will be under supervision of L. J. Call, engineer Carborundum Co., Niagara Falls.

Aluminum Steel Products Co., Plainwell, Mich., has been organized to manufacture aluminum levels and aluminum castings. It has rented former local plant of Wolverine Casting Co. and has installed machinery removed from plant at Royal Center, Ind. Company is prepared for operation and no additional equipment will be purchased.

Wings, Inc., 309 Dearborn Building, Dearborn, Mich., has been organized as manufacturers' agent for materials, ac-

cessories and parts used in manufacture of airplanes; to distribute airplanes and accessories through dealer organization and to operate flying school. Later company expects to take on lines of steel tubing and stream line wire and will construct buildings. C. V. Burnett is secretary and treasurer.

Milwaukee

MILWAUKEE, Sept. 24.—While new orders are not quite as numerous as earlier in the month, the September total of sales is expected to compare favorably with August. Inquiry continues active and the outlook for October business is considered favorable. Current sales run mainly to single items, but these are of good number and cover a wide range of industries. Automotive needs have declined somewhat after the heavy buying of the past three months.

Wisconsin Power & Light Co., 16 North Carroll Street, Madison, Wis., is taking estimates on equipment for a hydroelectric power plant, costing $150,000, at Rockton, Ill., consisting of two 600-kva. generators, two 750-hp. turbines, and auxiliaries. Bids on building will not be taken until equipment has been purchased. Company also will buy a 500-hp. boiler for a new boiler house at Beaver Dam, Wis. E. J. Kallevang is chief engineer.

Thompson Brothers, DePere, Wis., boat builders, will erect a one-story factory and warehouse addition, 100 x 160 ft., and are in market for wood and metal-working machinery.

Northern Conveyor Co., Janesville, Wis., contemplates erection of additions to double its capacity. Company erected an extension and increased its area 50 per cent last spring but is overcrowded. Detailed plans for further construction and equipment are under way.

Prentice-Wabers Products Co., Wisconsin Rapids, Wis., manufacturer of gasoline camp cook stoves, metal tables, chairs and cots, has placed contracts for a factory and warehouse addition, 70 x 176 ft., and a loading platform, 10 x 176 ft.

Nash Motors Co., Kenosha, Wis., has started work on additions to its branch factory at Racine, Wis., which will cost over $600,000. A new enameling unit with an "A" type oven and body storage house of 100,000 sq. ft. are principal items. Gear and axle shop, forge and heat treating departments and power plant also will be enlarged. D. M. Averill is general manager of Racine division.

Board of Regents, University of Wisconsin, expects to be ready about Nov. 1 for bids for construction of new mechanical engineering building, plans for which are being drawn by Arthur Peabody, State architect, Madison. An appropriation of $577,000 is available. M. E. McCaffrey is secretary of Board of Regents.

Hill-Hubbell Co., 160 Fremont Street, San Francisco, has placed general contract with Meredith Brothers Co., 253 Washington Street, Milwaukee, for a brick and steel shop, 50 x 150 ft., on property of A. O. Smith Corporation, Milwaukee, for processing electrically welded steel pipe made by Smith company for oil and gas fields. H. Hough is manager at Milwaukee.

Zenith Foundry Co., 567 Seventy-fifth Avenue, West Allis, Milwaukee, is building a shop addition costing about $20,000.

Simonds-Worden-White Co., Dayton, Ohio, has purchased R. J. Dowd Knife Works, Beloit, Wis. B. H. Meyer will be manager of Beloit works, but general offices will be in Dayton. Purchasing company is a recent consolidation of several firms in cutlery industry.

Milwaukee Foundry Equipment Co., 284 Seventh Avenue, Milwaukee, manufacturer of molding machines, has acquired tract of 92,000 sq. ft. and will erect manufacturing building.

Chicago

CHICAGO, Sept. 24.—With the close of the third week in September it is evident that sales for this month will not reach the August total, but will compare favorably with July which was considered good. Orders are more widely scattered and there is less broadcast inquiry, but business is coming quietly and in good volume from all sections of this district.

Studebaker Corporation, South Bend, Ind., is studying future requirements and Nash Motors Co., Racine, Wis., is building an addition. It is reported that Ford Motor Co. is planning to resume manufacture of tractors and will need some machine tool equipment. Allis-Chalmers Mfg. Co. has completed purchases for its tractor plant at Springfield, Ill., and is negotiating for equipment for its West Allis, Wis., plant. Chicago, Milwaukee, St. Paul & Pacific list is active.

Gray Goose Airplane Co., Hearst Building, Chicago, will build a hangar, 116 x 117 ft., to cost $50,000.

Commonwealth Edison Co., 72 West Adams Street, Chicago, will build a substation, 100 x 160 ft., to cost $200,000. MacDowell Construction Co., 140 South Dearborn Street, is general contractor.

Ketler-Elliott Erection Co., Chicago, will build a three-story foundry and machine shop, 80 x 90 ft. It will cost $90,000.

Fire and an explosion wrecked two-story brick factory of Rome Co., maker of bed springs, 1313 South Fifty-fifth Court, Cicero, Ill., with damage estimated at $150,000.

Accurate Steel Treating Co., Inc., Chicago, has removed to its new plant at 2226-28 Austin Avenue. Considerable additional equipment has been installed.

Oldfield Engineering Co., 2632 West Twenty-sixth Street, Chicago, manufacturer of gas plant equipment, is erecting two one-story units on site, 150 x 679 ft., recently acquired at Cicero, Ill., to total about 24,000 sq. ft. of space, and will remove to new location, with installation of additional equipment. Other structures will be built at Cicero later. Initial project will cost more than $85,000. Otto Randolph, Inc., 53 West Jackson Boulevard, is engineer and contractor.

International Harvester Co., 606 South Michigan Avenue, Chicago, is said to have plans for one and two-story additions to plant at Rock Island, Ill., to cost more than $500,000 with equipment. Contract has been let to H. K. Ferguson Co., Cleveland, for a new unit at Canton, Ill., plant, for grinding and steel shearing service, to cost $100,000 with equipment.

Knight Soda Fountain Co., 2701 North Kildare Avenue, Chicago, manufacturer of soda fountains and accessories, has asked bids on general contract for one-story addition, to cost about $40,000 with equipment. G. W. Klewer, 5 North La Salle Street, is architect.

City Council, Benson, Minn., will rebuild municipal electric light and power plant, to cost more than $45,000 with equipment. Arthur L. Mullergren, Board of Trade Building, Kansas City, Mo., is engineer.

Rapid City Airplanes, Inc., Rapid City, S. D., has plans for a hangar, with machine and repair facilities, at municipal airport at Huron, S. D., to cost about $25,000.

M. L. Kramer, 134 North La Salle Street, Chicago, architect, has awarded general contract to Callner Construction Co., same address, for three-story automobile service, repair and garage building, to cost about $300,000 with equipment.

Dahlin Brothers & Davis Mfg. Co., Minneapolis, Minn., manufacturer of furniture, has purchased site, 175 x 200 ft., at Burlington, Iowa, for new branch factory to cost about $40,000 with equipment.

About $1,000,000 damage was done to several plants by tornado which swept factory district in Rockford, Ill., Sept. 14. Loss to Elco Tool & Screw Co. was $200,000; National Lock Co., $10,000; Estwing Mfg. Co., $100,000; Rockford Chair Co., $200,000; South Union Furniture Co., $75,000, and Mechanics Machine Co., $10,000.

Philadelphia

PHILADELPHIA, Sept. 24.—Board of Education, Keystone Building, Philadelphia, is considering installation of manual training equipment in new four-story high school at Front and Ashaales Streets, to cost more than $2,000,000, for which plans are being drawn by Irwin T. Catharine, address noted, architect for board. Similar installation is also proposed in senior high school to be erected at Moore and Mifflin Streets, to cost more than $1,000,000, for which plans are being prepared by same architect.

Philadelphia Rapid Transit Co., Mitten Building, Philadelphia, has filed plans for one-story car shop, to cost about $65,000 with equipment.

Railway Track-Work Co., East Thompson and Clementon Streets, Philadelphia, has plans for a new one-story machine shop, 56 x 100 ft., to cost about $40,000 with equipment.

Philadelphia Air Terminal, Inc., Philadelphia, represented by Francis B. Biddle, Morris Building, attorney, has been organized to establish and operate a local airport. About 140 acres has been secured at South Philadelphia and plans are under way for hangars, repair and reconditioning shops, oil storage and other buildings. Project is reported to cost about $1,000,000.

White Co., 842 East Seventy-ninth Street, Cleveland, manufacturer of motor trucks, has awarded general contract to Barclay White & Co., 22 North Thirty-sixth Street, Philadelphia, for one-story and basement factory branch, service and repair station, 75 x 100 ft., Philadelphia, to cost more than $75,000 with equipment. Hadlow, Hughes & Hicks, Conrad Union Mortgage Building, Cleveland, are architects.

Board of Education, Pleasantville, N. J., is planning installation of manual training department in new two-story high school in Ansley Park section to cost about $600,000, for which revised plans are being prepared by S. Hudson Vaughn, Guarantee Trust Building, Atlantic City, N. J., architect.

Reading Coal & Iron Co., Reading Terminal, Philadelphia, is reported plan-

ning construction of new coal breaker near Locust Summit, Pa., with electrically-operated machinery, to cost more than $400,000 with equipment. Company has begun construction of new breaker at Westwood, Pa., to cost close to same sum.

Board of Education, Scranton, Pa., plans early call for bids on general contract for four-story addition to technical high school, to cost about $500,000 with equipment. A. J. Ward, Scranton-Lackawanna Office Building, is architect. Tudor Williams, Scranton Life Building, is supervising engineer.

American Welding Co., Carbondale, Pa., is planning enlargements to double, approximately, size and capacity, to cost more than $100,000. Company is a subsidiary of American Car & Foundry Co., 30 Church Street, New York.

Cincinnati

CINCINNATI, Sept. 24.—While machine tool orders have been in fairly good volume, the September total is expected to fall considerably below that of August. However, this is not a surprising development in view of the fact that August bookings attained "boom" proportions. There are, of course, several exceptions to the general run of activities, at least two important builders having reported that sales this month are from 15 to 25 per cent above those of August. That the present satisfactory conditions are likely to continue during the remainder of September and in October is the opinion of local machine tool executives, based on the large volume of pending inquiries.

A substantial portion of business placed in the past 30 days is traceable either directly to automobile manufacturers or to companies dependent upon the automotive industry. The widespread buying in that field is attributed to changes in equipment necessitated by building new models and to the need of reducing manufacturing costs to meet low-priced competition. Another source of recent orders is oil companies in the Southwest and also companies making tools for use in oil fields.

Production of Cincinnati machine tool builders is being sustained on a high plane and unfilled orders on hand are sufficient to insure the maintenance of present operating schedules indefinitely.

Trailer Co. of America has been organized in Cincinnati as a holding company and has acquired control of Trailmobile Co. of that city and Lapeer Trailer Corporation, Lapeer, Mich. Both companies will continue to operate as separate manufacturing and selling organizations under direction of J. Englaender, president, and S. B. Winn, vice-president and general manager. Caleb W. Shipley, former president of Trailmobile Co., has retired from management of that company.

City Council, Columbus, Ohio, contemplates construction of municipal airport, with hangars, repair and service shops, oil storage and other buildings. A fund of $180,000 is being arranged for project.

New mill of Tennessee Copper & Chemical Co., Copperhill, Tenn., one story, 210 x 420 ft., will be located at Evandale, Ohio, instead of Copperhill, previously announced. It will cost over $400,000 with equipment.

Gilbert Chevrolet Co., 2131 Gilbert Avenue, Cincinnati, local representative for Chevrolet automobile, has plans for four-story service, repair and sales building to cost about $100,000 with equipment. Architectural department, General Motors Corporation, Detroit, is in charge.

Knoxville Power & Light Co., Knoxville, Tenn., is planning for installation of new converter station for power service for traction lines, to cost about $50,000.

Gardner-Harvey Container Co., Middletown, Ohio, recently organized by Edward T. Gardner and associates, has awarded general contract to F. K. Vaughn Co., Hamilton, Ohio, for new mill to manufacture corrugated box-board containers, comprising main one-story plant, 120 x 540 ft., with storage and distributing building, 54 x 200 ft., to cost $300,000, of which more than $100,000 will be used for equipment. Management, Engineering & Development Co., Dayton, Ohio, is engineer.

Metal Aircraft Corporation, Cincinnati, has awarded general contract to Ferro Concrete Construction Co., Third and Elm Streets, for one-story plant, to cost about $60,000 with equipment.

LeBlond-Schacht Truck Co., Eighth and Evans Streets, Cincinnati, has purchased O. Armleder Motor Truck Co., Twelfth and Plum Streets, and will operate as subsidiary. New company will be organized as division of purchasing company to operate Armleder department. It is purposed to concentrate production largely at works of purchasing company, which will be expanded.

St. Louis

ST. LOUIS, Sept. 24.—Contract has been let by Chandeysson Electric Co., 4092 Bingham Avenue, St. Louis, manufacturer of plating electric units and kindred apparatus, to Widmer Engineering Co., Roosevelt Building, for one-story addition, to cost $60,000 with equipment.

Skelly Oil Co., 2605 Walnut Street, Kansas City, Mo., is having plans drawn for a two and four-story oil storage and distributing plant, 60 x 160 ft., to cost about $40,000 with equipment. Stephen C. Kenney, Gloyd Building, is architect.

American Crystal Co., 1031 Schafield Building, Cleveland, is arranging for development of mineral properties near Caddo Gap, Ark., where about 350 acres has been secured, installation to include pumping machinery, electric power equipment, drills, etc.

City Council, Texarkana, Ark., has acquired 200 acres as site for municipal airport, and contemplates construction of hangars, repair and reconditioning shops, oil storage and other buildings.

Jerpe Cold Storage Co., 1116 Douglas Street, Omaha, Neb., has plans for four-story cold storage and refrigerating plant addition, to cost about $65,000 with equipment. J. T. Allen and N. S. Wallace, Brandeis Theater Building, are architects.

Layton, Hicks & Forsythe, Oklahoma City, Okla., architects, have plans for five-story automobile service, repair and garage building, to cost more than $100,000 with equipment.

Arkansas Natural Gas Corporation, George T. Koch, Ardis Building, Shreveport, La., chief engineer, has awarded contract to Booth & Flinn, Inc., 1942 Forbes Street, Pittsburgh, for construction of pipe line from Clarksville to Little Rock, Ark., about 105 miles, to cost more than $500,000 with compressor stations and other mechanical equipment.

Texaco Oil Co., Third and M Streets, Lincoln, Neb., has plans for new storage and distributing plant to cost about $40,000 with equipment.

Missouri Pacific Railroad is in market for one 44-in. side head-boring and turning mill, motor-driven, with four-jaw independent chuck table.

City Council, Poplar Bluff, Mo., has approved report of special committee recommending calling special election to vote $225,000 bonds for new filtration plant, additional water tower, and installation of meters on all hydrants for city's waterworks.

Conveying machinery, power, processing and other equipment will be installed in new mill at Denver, of Ralston Purina Co., 827 South Eighth Street, St. Louis, to cost about $500,000. Project will include a power house.

Gulf States

BIRMINGHAM, Sept. 24.—Officials of Kane Boiler Works, Inc., Galveston, Tex., have organized new company of same name, with capital of $200,000, to take over and expand present plant and business.

Kansas City Southern Railroad Co., Kansas City, Mo., is arranging an expansion program at Dowling yards, near Beaumont, Tex., to include new engine house, machine shop, power house and other units, entire project to cost more than $500,000, including additional yard facilities, turntable, etc.

Roller Stock Guards Corporation, Anniston, Ala., recently organized with capital of $50,000 to manufacture roller type steel cattle guards for railroads, has acquired local property for erection of one-story plant, to cost close to $30,000 with equipment. M. P. Lightfoot is president.

E. J. Roberts, Comanche, Tex., and associates are planning construction of new ice-manufacturing plant at Mineral Wells, Tex., to cost $50,000 with machinery.

State Board of Control, Austin, Tex., is considering construction and operation of State-owned cement mill for initial output of 500 bbl. per day, to cost about $500,000 with machinery.

Smith Brothers Properties, Inc., 117 Villita Street, San Antonio, Tex., has awarded general contract to McKenzie Construction Co., Travis Building, for seven-story automobile service, repair and garage building, 90 x 100 ft., to cost over $250,000 with equipment.

Texas-Worth Tool Co., Fort Worth, Tex., oil well tools and equipment, has leased a building at 2400 West Seventh Street, and will remodel for new manufacturing plant.

Rome Electric Range Co., Huntsville, Ala., is completing plans for new plant, with intial unit one story, 50 x 250 ft., to cost over $60,000 with equipment.

Edcouch Machine & Electric Co., Edcouch, Tex., A. P. Peters, head, has awarded general contract to Stone & Phillips, Wescalo, Tex., for two-story machine shop, to cost about $30,000 with equipment.

Pan-American Airways, Inc., Miami, Fla., recently organized, has purchased 130 acres at N. W. Thirty-sixth Street and Forty-second Avenue, and plans construction of new airport, including hangars, service and repair shops, oil storage and other buildings, to cost about $50,000. Headquarters are at 100 East Forty-second Street, New York. Delano & Aldrich, 126 East Thirty-eighth Street, are architects.

Worsham Buick Co., Pacific Avenue and Olive Street, Dallas, Tex., representative for Buick automobile, has filed plans for three-story service, repair and sales building, 152 x 215 ft., to cost $175,000 with equipment. C. H. Griesenbeck, Dallas, is architect.

Todd Dry Dock & Shipbuilding Co., Mobile, Ala., has acquired 10 acres of waterfront property adjoining plant, and plans construction of additional units, to cost over $100,000 with equipment.

Gulf Power Co., Pensacola, Fla., is disposing of a preferred stock issue of about $720,000, a portion of proceeds to be used for extensions and improvements in power plants and system.

Pacific Coast

SAN FRANCISCO, Sept. 20.—Plans are being considered by Bach Aircraft Co., Los Angeles, for new plant at Metropolitan Airport, near North Hollywood, to consist of parts and assembling departments. Airport organization has plans for two hangars, 100 x 130 ft., with machine and repair facilities, and will begin work soon. Waldo Waterman is manager of Metropolitan Airport.

Stauffer Chemical Co., Los Angeles, will build a one-story machine shop in connection with new plant at Dominguez Junction, near Compton, for which general contract has been let to Union Iron Works, Los Angeles. Project will cost about $100,000 with machinery.

Los Angeles Can Co., Los Angeles, is planning to rebuild part of plant destroyed by fire Sept. 15, with loss of about $200,000 including equipment.

Richfield Oil Co., Bartlett Building, Los Angeles, has plans for new oil storage and distributing plant on Sacramento River, near Sacramento, Cal., to cost about $750,000 with equipment. Project will include machine shop, automobile service and repair building, pumping station and other units. Henry Carr is company engineer at Los Angeles, in charge.

J. H. Henry and associates, Pasadena, Cal., care of H. E. Tabor, Pasadena, engineer, has plans for lumber mill, with machine shop, power house and auxiliary structures near Pinehurst, vicinity of Medford, Ore., to cost about $175,000 with equipment.

Arizona Edison Co., Douglas, Ariz., is planning new power house at Naco, Ariz., and will remove present steam-operated electric station at Bisbee, Ariz., to that location, where additional equipment will be provided for increase in output. Extensions will be made in transmission lines.

Texas Co., Yeon Building, Portland, has filed plans for a one-story pipe shop, with power house and pumping station at its oil storage and distributing plant on St. Helens Road, to cost about $35,000 with equipment.

Inland Empire Paper Co., Spokane, Wash., has authorized plans for expansion at its mill at Millwood, near Spokane, to double present capacity, and to cost more than $250,000 with machinery.

Pacific Coast Cement Co., 3801 Marginal Way, Seattle, has plans for two new units, to cost about $45,000 with equipment.

Municipal power department, Seattle, has plans for new municipal hydroelectric power plant at Diablo dam, to cost $3,000,000 with machinery and transmission lines. A bond issue has been arranged. W. D. Barkhuff is city engineer.

Fir-Tex Insulating Board Co., St. Helens, Ore., recently organized by Herbert Fleishhacker, San Francisco; Kenneth D. Dawson, Portland, and associates, has plans for new mill at St. Helens, with initial units covering area of 100 x 1400 ft. A power house, machine shop and other units will be built. Project is estimated to cost $2,000,000 with machinery. H. F. McCormick, St. Helens, will be an official of new company.

Indiana

INDIANAPOLIS, Sept. 24.—Studebaker Corporation, South Bend, Ind., has plans for one-story addition, 62 x 302 ft., to cost about $80,000 with equipment. Company is also having plans drawn for one-story oil storage and distributing building, 72 x 180 ft., to cost about $40,000 with equipment. Lockhart & Fett, Associates Building, are architects for both structures. Permit has been secured for new one-story unit to cost about $50,000, and for a one-story machine shop, 307 x 425 ft., to cost approximately $270,000 with equipment.

Conveying machinery, power and other equipment will be installed in new powdered milk plant to be built by Hoosier Milk Condensery Co., Bluffton, to cost close to $50,000 with machinery.

National Tile Co., Anderson, Ind., has plans for a one-story addition, 88 x 415 ft., with tunnel kiln, loading racks, kiln cars, and other equipment, to cost more than $100,000.

Roxana Petroleum Corporation, 520 Meyer-Kiser Building, Indianapolis, has plans for a two-story and basement, 70 x 100 ft., storage and distributing plant, to cost close to $30,000 with equipment

Board of Education, Kokomo, Ind., is said to be planning installation of manual training equipment in four-story addition to high school, to cost more than $190,000 with equipment. H. B. Bartlett, 1050 North Delaware Street, Indianapolis, is architect.

Canada

TORONTO, Sept. 24.—Machine tool buying in this market continues in good volume. Inquiries are more general and many are expected shortly to be placed. Electric power development is responsible for a growing call for machinery, and new undertakings in this line indicate a continued demand. Steel mills and foundries are also showing considerable interest in the market: the automotive industry is still a big factor.

Walker Brothers, Thorold, Ont., are in market for a second-hand steam engine, 50 to 75 hp.

City Council, Peterborough, Ont., contemplates purchasing two pumps for intermittent pumping station at Maurice and Smith Streets plant.

Mississippi Iron Works, Ltd., Almonte, Ont., contemplates moving its plant to Hull, Que., and it is understood that a new works will be erected.

Johnston Welding & Radiator Co., 2692 Dundas Street West, Toronto, will build an addition and purchase considerable new machinery and tools.

International Harvester Co., of Canada, Ltd., Sherman Avenue North, Hamilton, Ont., has awarded contract to Humphrey Brothers, 214 Wellington Street, East, for an addition, 60 x 120 ft., to its foundry, to cost $40,000.

Western Canada

It is reported that Fraser Companies, Ltd., Fredericton, N. B., is arranging for erection of a pulp and paper plant at Prince George, B. C., with daily capacity of 600 tons.

Dominion Government has granted a 30-year lease to North Western Power Co., subsidiary of Winnipeg Electric Co., Winnipeg, to develop hydroelectric power at Seven Sisters Falls power site. Construction work will be started immediately, and a railroad 14 miles long will be built from Whitemouth Junction to site. About $8,000,000 will be spent on project.

Foreign

BIDS will be received by Electricity Supply Commission of South Africa, Cape Town, until Oct. 26 for plant and equipment for a hydroelectric power station and outdoor substations at Cape Province, Inquiry No. 236.

Swedish Chamber of Commerce of United States, 25 Beaver Street, New York, has received an inquiry, Ref. 278, from a company in Sweden, interested in purchase of American-made air compressors and floor-scraping machines.

Foreign Light & Power Co., organized by J. G. White & Co., 37 Wall Street, New York, and Motor-Columbus Corporation for Electrical Enterprises, Baden, Switzerland, is disposing of a preferred stock issue of $5,000,000 and will soon arrange additional financing in amount of $3,500,000 for power acquisitions and development in France, Germany and Italy, including generating stations, transmission lines, etc. New company will be under direction of J. G. White Engineering Corporation, 43 Exchange Place, New York.

Argentine Department of Public Works, Buenos Aires, has approved a project for five new pier docks in north outer port of local harbor, to include mechanical handling machinery, conveying apparatus, loading equipment, etc. Project will cost about 6,185,550 pesos (about $2,600,000).

Department of Finance, Republic of Chile, Santiago, Senor Don Pablo Ramirez, minister of finance, is disposing of bond issue of $16,000,000 in United States for construction of railroads, port works, irrigation lines, sewage and waterworks, and public buildings, including mechanical and power equipment.

Broken Hill Proprietary Co., Newcastle, New South Wales, Australia, has approved plans for construction of coke oven plant, with by-products divisions, to cost $5,000,000 with equipment.

Venezuela Gulf Oil Co., 21 State Street, New York, has closed negotiations with Mexican Seaboard Oil Co., 120 Broadway, and its subsidiary, Venezuelan Seaboard Oil Co., for lease of 40,000 acres on west coast of Lake Maracaibo, Venezuela. Leasing company plans early development for oil production and will install drilling machinery, pipe lines, storage and distributing facilities and other mechanical equipment.

Boston steel treaters will hold their ninth annual banquet and smoker on Monday evening, Oct. 1, at the University Club, Trinity Place, Boston. This will introduce the 1928-1929 program of the Boston chapter of the American Society for Steel Treating.